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BUSINESS CONDITIONS IMPROVING— REASONS FOR CONFIDENCE

Within the last six months — dating back to the stock market collapse— many lines of business have been in the dumps, but the shrewd observers now agree that real improvement is beginning. They are not the optimists, either, who give out roseate statements just to get their names in the newspapers. They are the cold-blooded analysts who say that business will pick up from now on, for the simple reason that it has reached the bottom of the valley of depression and there is nowhere else to go but forward.

There hasn't been so much luxury-buying during these six months, but the people's need of essentials continues—in fact, increases for the population is growing fast, and it takes more business every year to supply these necessities. Several billions of new wealth will be created this year by the production of crops and the manufacture of goods to be distributed throughout the world.

* * * *

Conservative leaders say that the worst has happened and that, having got down to fundamentals, American business will steadily improve.

As one observer briefly puts it: "Industry is not going to the bowwows. Even unemployment has its benefits, for it makes workmen understand that they must give a dollar's worth of work for each dollar received. People who have jobs are paying more attention to their duties. Needless extravagance has been curtailed.

"Instead of having disappeared, our great stores of natural wealth are being opened up as never before and the values thereby created are real, not the kind of profits merely built up on paper. Paper profits are what we had during the stock market boom."

* * * *

In the telephone field government figures show that business is steadily advancing and that service companies are experiencing a healthy growth, notwithstanding the slackness in other lines. The companies reporting to the Interstate Commerce Commission operate approximately 17,000,000 telephones, or about 85 per cent of the total number of stations in United States.

During the first two months of 1930 the number of telephones in service reported by these companies showed an increase of 823,716 over the same date in 1929. Gross operating revenues showed a growth of 5.7 per cent. The net operating revenues registered only a very slight gain for February, but with an improving tendency over the preceding month (January), which had shown a loss compared with January, 1929.

* * * *

In discussing business operations for the first quarter of 1930 there has been a tendency to emphasize the losses, as compared with 1929, without paying much attention to the industries which have shown gains. This has been the hobby of the pessimists who are still mourning because they did not sell their stocks at boom prices.

As a matter of fact, one review shows that in 34 representative industries higher earnings have been made this year as a result of effective advertising and good management, which indicates that intelligent methods will succeed even in the face of difficult conditions which hold others back.

* * * *

And what of the future? Here is the answer given by Floyd W. Parsons, a well known research expert in the public utility field:

"Everyone knows that business is subnormal, and most people are agreed that we have reached the bottom of the valley. But whether this valley is narrow or wide, wisdom dictates that we hasten to prepare for an era of unlimited speed.

We approach telephonic communication between racing trains and the rest of the world; super-highways leading in and out of cities; radio-regulated timepieces; seadromes that will make travel by air across oceans simple and safe; new types of cities that will develop in the clouds and underground; trains in the skies made up of engineless gliders; soundproof and windowless buildings that will be supplied with medically prescribed light and weather; frozen foods; vending machines in apartment houses; education by talkies; and a total gasoline consumption in the United States of 2,000,000 gallons every hour.

The future was never so bright, especially for the utilities. Business will be all the healthier for a little housecleaning. Our farms, factories, ships, motors, railroads and supplies of gold are intact, and

our people have not been incapacitated either physically or mentally.

Grappling with difficulties is the only way to overcome them. If there were no serious troubles to face, there would be no success; if there were nothing to struggle for, there would be nothing to be achieved. Instead of groaning over our hard luck, scanning the horizon for clouds not yet in sight, let us grin, work and show contempt for the preachings of the weak-kneed apostles of misfortune. Persistent people begin their success where the quitters leave off."

American business methods have made wonderful advance in efficiency in recent years, but in no line has there been greater improvement than in the handling of long distance telephone service. This in itself has been an important aid to speeding up general business, as effective communications help every branch of industry.

Ten years ago, according to the Bell records, on the average about 13 minutes elapsed after a call was placed at the toll board until conversation started or a definite report was given, whereas today long distance calls are handled with an average speed of but two minutes.

Several factors have contributed to this marked improvement. Outstanding among these is the introduction of the combined line and recording method; and, of course, improved equipment arrangements and better operating performance have also helped. Also, customers have become more fully acquainted with the advantages of toll service and have learned how to make better use of it.

* * * *

"Contributing to the faster speed of service and the ease with which customers make long distance calls," according to the headquarters bulletin of the Bell system, "has been the increasing number handled while the customer remains at the telephone. At the present time users of long distance service remain at the telephone to a report or conversation on approximately 77 per cent of the calls, whereas 10 years ago it was necessary to file the call and then hang up the telephone to await completion of report.

"On toll calls handled at 'A' boards and commonly known as A-B calls, the customer, of course, always has remained at the telephone to conversation or station report. These calls represent 70 per cent of the total toll business, so that today all but a small percentage of all toll calls are handled while the party remains at the telephone."

It is likewise interesting to note that along with the improved speed of service on long distance calls, while 10 years ago only 81 per cent of the long distance calls were completed, today this figure has grown to 90.5 per cent.

The explanation is made that the improvements in speed and transmission on long distance calls have had much to do with the success in extending the toll system to greater distances.

Only ten years ago long distance telephone service was confined to the United States and Canada, whereas today the service is available also to Mexico, Cuba, 24 countries in Europe, three countries in South America, while further extensions are likewise definitely in sight.

COMING CONVENTIONS

Independent Telephone Association of Washington, Hood River, Ore., June 10 and 11.

Telephone Association of Vermont, Hotel Van Ness, Burlington, June 26 and 27.

Illinois Telephone Association, Pere Marquette Hotel, Peoria, November 12 and 13.

Simple Service Survey for Magneto Plants

Routine for Making Talking Tests Through Network of Resistance Causing a Fixed Transmission Loss—Network Is a Standard for Satisfactory Transmission—First Award, Plant Division, "Telephony's" Prize Article Contest

By T. De Witt Talmage,

Transmission Engineer, Illinois Telephone Association, Springfield, Ill.

The best-informed subscriber may know nothing of the financial structure of a telephone company or its problems in disposing of its securities; he may know nothing about the organization or functions of the departments, and nothing concerning the duties of the employes. Yet the most ignorant subscriber will quickly know if the operators repeatedly disconnect him in the middle of a conversation, if he cannot make the distant party hear him, if he cannot hear the distant subscriber talk, if the connection is noisy and annoying, or if he is forced to endure delay in securing his connection.

In every move a telephone company makes, in everything it does, there is service rendered or omitted. From the time the company representative first interviews the prospective subscriber about furnishing him telephone service until the subscriber's service is discontinued and his final bill paid, the company's sole business is to serve him. For his telephone conversations he pays a monthly service fee as does his neighbor, but he is entitled to prompt installations, continuous service, uniformity and courtesy of operators' practice, good transmission, moves and changes in a workmanlike manner, and careful consideration of complaints, for which he pays only indirectly.

From this it follows that the job of any telephone company resolves itself into the rendering of such essential elements of service for the benefit of its subscribers. But in thinking of telephone service we are likely to make the mistake of having in mind only a few of the more important factors. The commerce commission law of the state of Illinois contains this:

"The term 'service,' when used in this act, is used in its broadest and most inclusive sense, and includes not only the use or accommodation afforded consumers or patrons, but also any product or commodity furnished by any public utility and the plant equipment, apparatus, appliances, property and facilities employed by, or in connection with, any public utility in performing any service or in furnishing any product or commodity and devoted to the purpose in which such public utility is engaged and to the use and accommodation of the public."

When the average subscriber says the telephone service is poor, he usually means that the operators' answering time is slow or that the service is subject to frequent interruptions or that the grade of transmission varies. By this last-mentioned item is meant the presence of conditions which cause a noticeable contrast between different messages in the ease of conversation; that is, a connection on which the transmission is excellent is followed by a connection which is only fair, yet the difference is so

great that the subscribers class the latter connection as poor or unsatisfactory.

These are no doubt some of the most important factors which enter into the telephone service but an analysis of complaints will show every conceivable objection to the service. Criticisms are made of equipment, methods of operation, kind of treatment accorded subscribers, extension policy, and many other features. In fact, the broad definition from the Illinois Commerce Commission law quoted has been found none too broad to cover the large range of subjects to which attention must be directed if the service is to be classified as standard.

An example of the subscriber's attitude in some of the smaller exchange areas is aptly illustrated by the following bit of so-called poetry:

"Our telephone is a relic,
Thirty years old if a day;
The receiver is rusted and the voices
Sound distant and far away;
We wait five minutes for Central
To mumble "Number, Please?"
We then get a scratchy connection
And a case of hebee jebees.

They charge us for a private 'phone,
With forty on our line;
They ring the beauty parlor when
We ask for the coal mine;
Or if they ring the party right,
We find the line is dead,
Or there's crosstalk, noise and gossip
So we can't hear half that's said.

Too often subscribers' complaints are received with only dull indifference and the investigation is only half-hearted. Of course, some subscribers make complaint upon the slightest provocation, whether real or imaginary, while others will find fault only when the service is extremely poor. Those who neglect to report any deficiency in the company's service often complain to their neighbors about the company and cause additional dissatisfaction.

Any company will find considerable advantage in making a determined effort to correct all causes of complaints and making it known that they welcome the information when the service is unsatisfactory. The proper handling of complaints depends upon the promptness of correction, courtesy and tact of employes and the action of the company in preventing the recurrence of the causes of the complaints. The service survey described in this paper will go a long way toward reducing the number of complaints, insofar as the volume and quality of transmission is concerned.

"With Such a Simple and Inexpensive Testing Method Available," Says Mr. Talmage, "There Should Be no Excuse for Poor Transmission in Magneto Subscribers' Loops and Stations."

One of the basic elements entering into good telephone service is, of course, continuity of service or freedom from interruption. A few interruptions at a time when they least affect the subscribers need not be considered serious, but many long interruptions at times when the service is needed are provoking to the subscribers. Not only are such conditions annoying and irritating but they may cause considerable financial loss. For these reasons inside plant equipment is designed and manufactured with the thought of ruggedness and reliability continually in mind.

The necessity for freedom from trouble and the ability to withstand exposure cannot receive too much attention in the planning and construction of the outside plant. It is principally the selection of the kinds of material, sizes of material, methods of construction, etc., together with the kind and gage of the open wire, that control the reliability of the telephone system. Of these factors the kind of gage of the open-wire circuits come under consideration probably the most frequently.

From the transmission requirements it may be that a comparatively small gage circuit would be satisfactory, but it may be that the necessity for continuous service might be found of sufficient importance as to warrant the use of stronger wire. In such cases the choice of the gage of wire might well be governed by the necessity for mechanical strength which in general would result in better transmission as well as increased reliability. Poorly-constructed systems in addition to being unreliable, require excessive maintenance costs. Any saving in original investment which results in excessively high maintenance charges is certainly not good judgment.

But the telephone plant, even if it is of the best possible construction, deteriorates in service. Prompt and thorough repair and replacement retards this deterioration and postpones replacing and rebuilding the system. If such a policy is followed intelligently, the expense of operation will be decreased, and the telephone service furnished the subscribers may be maintained at a satisfactory level.

Fig. 1 is an interesting chart because it shows the relative distribution of transmission troubles found in the toll and local exchange plant in one study. This study was based on investigations of reports of poor transmission originating in the traffic department. This chart clearly shows the need for more thorough maintenance meth-

The quality of transmission in the smaller exchanges of the country is now being given greater attention than ever before, due to the important part the small exchange is taking in the long distance telephone system of the company.

In this article Mr. Talmage describes a network plan of testing of magneto subscribers' loops and stations. By means of this network, talking tests may be made between the exchange and the subscribers' instruments. Unsatisfactory stations can be quickly located by means of the simple method of testing.

Mr. Talmage, who is transmission engineer of the Illinois Telephone Association, has had a wide range of experience, from cable splicing and research work. He studied electrical engineering in the University of Cincinnati, specializing in communication engineering. He has been engaged in telephone work since early in 1923 and has been associated with the Illinois Telephone Association since 1926.

In addition to furnishing transmission maintenance service to the Illinois companies, Mr. Talmage is the technical editor of the Illinois Telephone Handbook, which is assuming the position of a major activity of the Illinois Association. Requests for the 1929 edition of the handbook came from 16 foreign countries in far corners of the world, in addition to many companies and organizations in this country, and the supply is now exhausted.

Mr. Talmage's particular work and experience well qualify him to write authoritatively on this subject of "A Simple Service Survey for Magneto Plants." Men, well-informed in telephone maintenance, predict that the time is not far distant when every magneto switchboard will be equipped with a network such as Mr. Talmage describes, as a standard test circuit. Many small exchanges in Illinois are already making use of such a plan of testing and the idea is spreading to other states. Hence the wide-awake manager should be greatly interested in reading and pondering upon this article.

ods in the local telephone exchange plant.

Because troubles are probably more difficult to detect and control in the local exchange plant, as compared to the toll plant, and because a large percentage of troubles causing transmission complaints

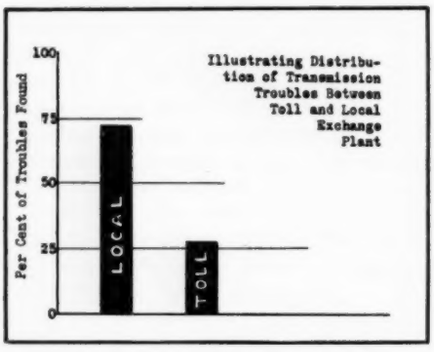


Fig. 1. Showing the Need of More Thorough Maintenance Routines in Local Exchange Plant.

is located in the local plant, it would seem that any constructive effort to improve such unsatisfactory conditions would be desirable and a forward step in maintenance work. A trained organization should not be handicapped by inefficient plant and equipment.

It is impossible to obtain reliable and efficient operation without providing for systematic and periodic tests and inspections in order that any unsatisfactory conditions revealed may be remedied. Visual inspections alone are inadequate. Visual inspections must be backed up with routine tests for insuring a reduction of troubles and increasing plant efficiency. The object of these routine tests might be classified somewhat as follows:

1. Maintaining an operating dependability.
2. Determining when and where troubles occur.
3. Exposing useless and inefficient plant equipment.
4. Increasing the efficiency of apparatus, individually and collectively.
5. Producing maximum retardation of equipment depreciation.
6. Reducing to a minimum the necessity for repairs to plant equipment.
7. Determining the necessity of additional plant equipment and determining whether purchased equipment meets specifications.

Maintenance work in magneto (local battery) exchange areas should not require the use of many high-priced testing instruments. The personnel of most magneto exchanges is not equipped either by training or experience to use delicate and complicated electrical meters to full advantage. Low initial cost, stability of adjustment, simple and speedy operation, and effective results should characterize testing equipment used in magneto exchanges.

In order to secure a proper telephone connection it is necessary to have, in addition to other things, satisfactory substation conditions. In other words, the subscribers' talking tests through a network gives a direct indication of how the subscriber's telephone and its associated line is *actually* functioning. This is in contrast with the heretofore customary electrical tests as incorporated in local exchange test desks, which gave only an indirect indication of whether the circuit was in a condition to function to the satisfaction of the subscribers. Troubles which may be ordinarily difficult to detect are readily located by means of this talking test. The result is that all subscribers receive a uniform and standard grade of transmission on either local or long distance messages.

A network suitable for use in a magento exchange setup is shown in Fig 2. This wiring diagram shows four 240-ohm resistances and one 140-ohm resistance connected in the form of H with the 140-ohm resistance serving as the horizontal bar of the H. structure. It is possible to secure a 480-ohm resistance unit with a third connection to the middle point which serves very nicely to reduce the number of individual units to three. The total cost of such a network is insignificant being, aside from labor of wiring and installing, only $1.80.

These resistance units should be practically "non-inductive" (that is, should not

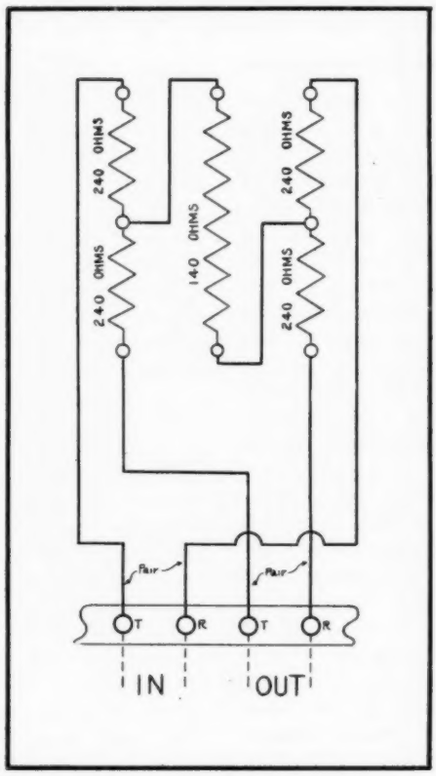


Fig. 2. Circuit Drawing of Network Approximating a Transmission Loss of 20 DB.

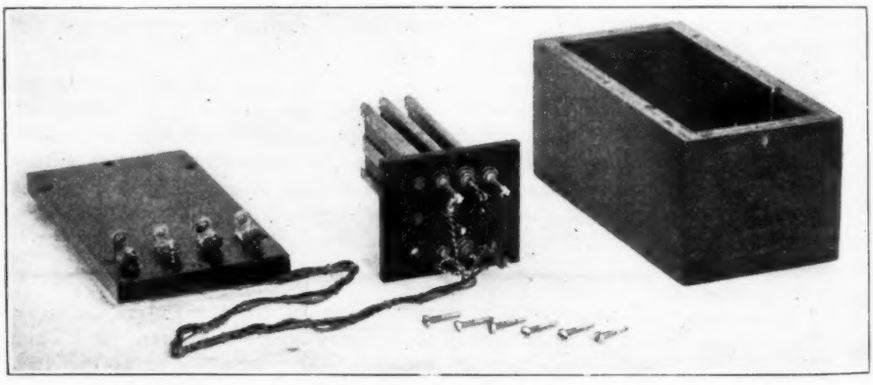


Fig. 3. View of a Portable Network Showing Details of Assembly.

loops and apparatus must be built, installed and maintained in such a way that a commercially acceptable grade of service can be furnished. One of the most practical methods of discovering serious losses in the overall transmission of subscribers' loops and stations in magneto exchange areas is to make a "talking test" over the subscriber's circuit by inserting in the test circuit a network of resistances causing a fixed transmission loss.

The introduction of this network into the talking circuit serves as a standard for satisfactory magneto telephone transmission. The insertion of the network acts to artificially lengthen the connection by 66.0 miles of new No. 12 gage open iron wire circuit (equivalent to 263.1 miles of No. 12 N. B. S. gage open copper wire circuit). When this is done the conversation, although slightly reduced in volume, should be understandable and natural in quality.

In other words, the routine of making induce potentials in adjacent windings or other electrical conductors). This is accomplished by winding simultaneously two conductors instead of one, with the two conductors tied together at one end and used as resistance terminals at the other end. The accuracy of the resistance units of ordinary grade is usually within plus or minus 5 per cent, which is close enough for the purpose of making talking tests. More accurate resistance units may be secured, accurate to within one-half of one per cent of the values of resistance shown in Fig. 2, at an increased price, from manufacturers of precision electrical testing equipment.

The network shown in Fig. 3 was constructed with the idea of having available a portable network. It consists of three flat-type resistance units wired as shown in Fig. 2. The resistance units are fastened on a Bakelite plate and mounted in an oak box 3 inches square and 6 inches

long. Connections are brought out by means of four terminal punchings with screw connections on one end. The terminal punchings are screwed to the top of the box which is, in turn, held in place by six wood screws shown in the photograph. Such a portable network could be used in rotation by several exchanges.

The flat type of resistance shown in Fig. 3 consists of bare, special high-resistance

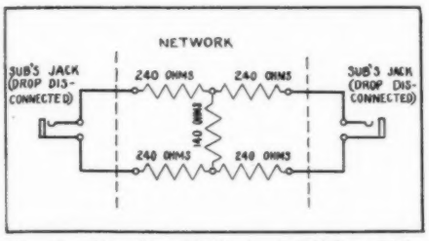


Fig. 4. Showing Method of Wiring Network in Magneto Switchboard.

wire covered with micanite. Resistance coils are also wound on spools or bobbins. Formerly it was the practice to wind resistance coils on wooden bobbins, but, in the better class of work, these bobbins have been replaced by metal spools. A layer of shellacked silk which is dried out by baking before the coil is wound, serves to thoroughly insulate the wire from the metal spool. Coils of either type of construction may be used to construct the network proposed in this article in place of the flat type, so long as the windings are non-inductive.

It has been recommended, however, due to the usefulness and the nominal cost of the network, that each magneto exchange be permanently equipped with a network similar to that shown in Figs. 2 and 3. In permanent installations it would not be necessary to make up an elaborate oak box to house each network. If the network was mounted in the rear of the switchboard, it could easily be assembled by separating the three resistances with insulating material and wrapping with friction tape. The entire assembly could then be fastened to the wood framework of the switchboard by means of a leather strap and two screws.

In new switchboards such a network could be specified in the order for the board and the installation handled by the manufacturer. The network could be wired in the switchboard by utilizing two subscribers' jacks with the drop windings disconnected as shown in Fig 4. This arrangement of wiring the network permits a flexible and convenient test circuit to be available at all times.

In some exchanges there is available only one repairman to make the tests with the network in the circuit. In that case the tests could be made between the repairman at the subscribers' instruments and the chief operator. In other cases there may be available two repairmen who can test back and forth. Another method, although not so desirable from some standpoints, is to have the repairman or chief operator at the exchange test with the subscribers talking over their own instruments.

The network may be wired in the switchboard in several different ways. For instance, in one study the network was wired in a cord circuit at one end of a position. The network was incorporated in the answering cord of that pair in order that the operator could test through the network with either the repairman or the subscribers. This cord pair was arbitrarily called the "network cord."

The repairman visited the subscribers' stations and, after a visual inspection of the instrument, rang the operator. He then asked for the "network cord" and a connection to the repairman's telephone located in the frame room of the exchange. Here another repairman was stationed and the tests were made between the two employes. A record was made of all conditions found as well as the steps taken to correct faulty conditions.

In this particular study a series of short paragraphs were read from the daily newspaper by the two repairmen. The subscribers' transmitting circuit was first tested because, as a rule, more trouble is found in the transmitting circuits than the receiving circuits. The receiving circuit was next checked by having the repairman at the exchange read from the newspaper.

This method is more desirable than reading the same group of words over and over again, for it is easily possible to memorize the groups of words and an accurate test is not secured. Care must also be taken to speak in an ordinary tone of voice directly into the transmitter, for there is sometimes a tendency to raise the volume of speech in making talking tests. In this study all dry cells were tested with an ammeter and those which tested less than five amperes per cell were replaced. All other trouble was likewise cleared at the time of the investigation.

In this same study a record was made of the total number of troubles found affecting the several classifications of service. For comparison purposes the following figures represent the number of separate transmission troubles in each classification on a basis of 100 stations tested in each class:

Classification	Troubles
Business	44.5
One-party residence	26.4
Four-party residence	29.9
Extension	27.3

From this analysis it will be noted that the business stations required the most repair work. Fig. 5 shows a photograph of a bushel basket full of defective and worn-out parts removed from one plant as the result of an extensive investigation with the network described. Since the business stations are comparatively easy to test frequently, it might be advisable to test such stations in the manner outlined herein twice each year, and the residence stations once each year. All newly-installed stations should, of course, receive a test with the network at the time of installation.

In one transmission investigation of subscribers' loops and stations making use of the network plan of testing, it was found that three out of every ten instruments within the city limits were unsatisfactory with the network in the testing circuit. In the same study it was also found that one trouble detrimental to transmission was found and cleared for every three stations visited. For every fault found in the receiver circuit of the subscribers' stations, two faults were found in the transmitting circuit. The greatest single offender against good transmission was exhausted dry cells.

In making general surveys of this nature, it is surprising to find that the large number of stations in service which have outlived their usefulness. A telephone instrument does not last forever and unless proper replacements are made the instrument will not perform satisfactorily. The ultimate life of a magneto telephone instrument has been set at 14 years in the accounting of depreciation for telephone companies in Illinois.

Many instruments never reach this old age because of rough and frequent handling. On the other hand, some instruments older than this seem to be still fairly satisfactory. When trouble is found in such instruments, it is desirable that the entire instrument be very thoroughly overhauled, or plans made for its replacement with a modern instrument.

This network will be found to be extremely valuable in testing rural stations as well as stations within the city limits One Illinois exchange went so far into the study of rural service using the "talking test" method as to have a complete inspec-

Fig. 5. Photograph Showing Bushel Basket Full of Defective and Wornout Parts Which Were Removed from Plant in One Survey.

tion form printed for tabulating the information secured from the tests. Fig 6 shows the form that was used by this company. The sheet is 8½ inches by 14 inches in size and was made up in the loose-leaf

style with holes punched on the left. These sheets were inserted in an ordinary three-ring binder with a canvas cover.

This form was filled in by the chief operator who would call a certain number of rural stations each day, preferably early in the morning. All questionable stations would then be referred to the repairman for his attention. In this plan the repairman would not visit the rural stations just to test with the chief operator, but the chief operator talked directly with the subscribers through the network.

One important fact emphasized by these network tests in that it is within the power of the subscriber to increase the value of the telephone both to himself and others. By this is meant that the more a subscriber knows about his telephone and how to use it efficiently, the better the company can serve him.

Thus it has been found that by educating the users of the telephone to talk with their lips the proper distance from the mouthpiece and to hold the receiver firmly against the ear and the transmitter in an upright position, further gains in efficiency may be secured. This is especially important when using the telephone for long distance connections.

The efficiency of the transmitter decreases rapidly as the distance between the speaker's lips and the mouthpiece increases. If this fact were more widely appreciated and more care taken to use the instrument correctly, the average grade of transmission would undoubtedly be considerably improved and many cases of extremely poor transmission eliminated. Thus it is not uncommon to find subscribers talking at least four inches from the mouthpiece, which will mean a decrease of volume of transmission equivalent to adding about 39 additional miles of No. 12 iron wire circuit in the talking connection. Fig. 7 shows graphically the loss caused in the case of magneto transmitters of different types when the subscribers' instruments are used incorrectly.

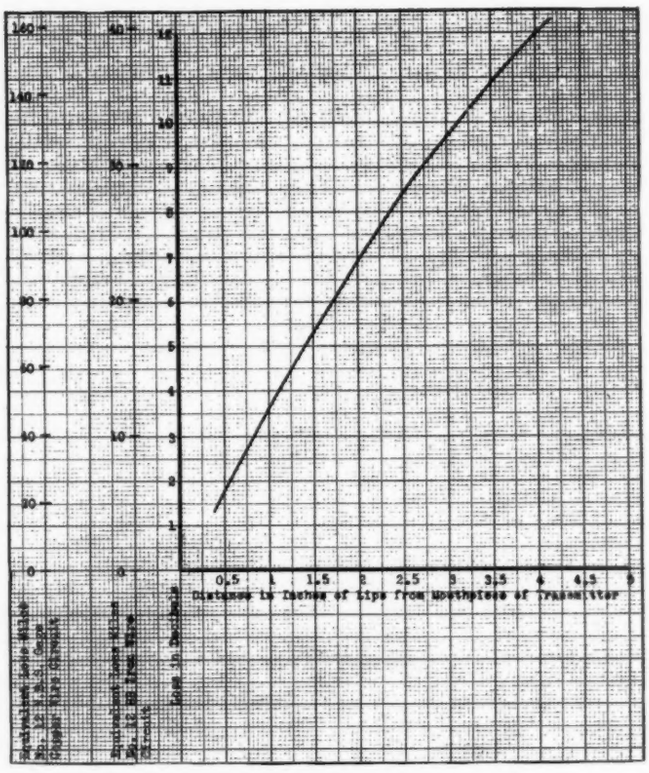


Fig. 7. Transmission Loss Due to Talking at Various Distances from Mouthpiece of Transmitter (Average of Several Types of Magneto Transmitters).

Many large business organizations have sent out memorandums to their employes concerning this loss of speaking efficiency advising: "Talk *directly* into the telephone transmitter at a distance of not more than one-half inch, using a clear, moderate tone of voice."

The network plan of testing proposed in this article offers an ideal opportunity for the repairman to instruct the subscribers as to the proper distance to place the lips from the mouthpiece and the necessity for speaking directly into the mouthpiece. If logical reasons for using the telephone correctly are given, the people will respond with more grace and the desired ends will be obtained more easily.

The need for improved transmission conditions is evident. With such a simple and inexpensive testing method available, there should be no excuse for poor transmission in magneto subscribers' loops and stations. Good service speaks for itself. Why not make your service talk well for you?

RURAL SERVICE TESTS, FOR YEAR_____ On Multi-Party Line No.____

COLOR CODE	NAME OF SUBSCRIBER	Monthly Tests JAN.	FEB.	MAR.	Subscriber's quarterly report on service	Monthly Tests APR.	MAY	JUNE	Subscriber's quarterly report on service	Monthly Tests JULY	AUG.	SEPT.	Subscriber's quarterly report on service	Monthly Tests OCT.	NOV.	DEC.	Subscriber's quarterly report on service
RED																	
WHITE																	
BLUE																	
BLACK																	
BROWN																	
GREEN																	
YELLOW																	
ORANGE																	
CHERRY																	
PINK																	
PURPLE																	
GRAY																	
ROSE																	

Fig. 6. Inspection Form Used by Illinois Company to Tabulate Information Secured in Using "Talking Test" Method on Rural Lines.

Judicious Spending to Improve the Net

How One Organization Is Increasing Efficiency of Operations by Every Means at Its Disposal—Traffic and Maintenance Savings—Replacing Old Equipment—Address at Convention of the Ohio Independent Telephone Association

By J. E. Albert,
Vice-President, Standard Telephone Co., Columbus, Ohio

There are three principal methods of improving net earnings. One method is through the securing of adequate rates for service where rates are not yielding a fair return. Another is through intensifying and developing the business in the territory served. A third is by increasing the efficiency of our operations by every means at our disposal. I shall treat mainly with this latter method.

Before dealing directly with this method I wish to point out the necessity for, as well as the results of, improving our earnings through these various means.

First of all, I am acutely conscious of the obligations of this utility to those it serves, and of the vital part it plays in every community. I interpret this obligation as requiring us in the telephone industry to constantly improve the quality of our product, and to do so at as reasonable a cost to the consumer as possible. The advancement in the telephone art has been so rapid and so revolutionary that the accomplishment of this objective calls for the maximum efforts of all those engaged in this business.

In order that our operations may keep pace with the rapid forward strides of the science of communication, these operations must be made to produce in every case, net earnings on the invested capital sufficient to attract additional capital for investment in the most modern and highly-improved types of equipment. I am convinced that the great grandfather of all bankers was born in Missouri, of Scotch parents, for they, as a class, must be shown what the Independent telephone industry can do before we can hope to convince them that this industry is a satisfactory investment field. If we fail to do this, we sound the death knell of the Independent telephone industry, and I assure you that it will not be a lingering death.

In order to illustrate some of the points I wish to present, it is necessary to give you a sketch of our own operations. The companies which I represent operate 77 exchanges in the state of Ohio, varying in size from 20 stations to 1,300 stations. The Ohio exchanges are fairly typical of the telephone properties operated by us in other states, the largest single exchange operated being Ashland, Ky., with 6,000 connected telephones. In Ohio we acquired 28 separate corporations, largely located in six more or less compact groups.

At the present time our billing and revenue accounting is carried on in three field offices in Ohio, our general accounting for Ohio—and in fact for all states except Kentucky—being located in our general office in Columbus. Direct savings through concentration of the billing at

"The True Operator," Says Mr. Albert, "Cannot Stand Still and Just 'Operate' His Property, But Must See It Constantly Improving So That Capital May Be Attracted."

three points and the general accounting in Columbus have been small, the main move in the direction of efficiency from this concentration being more accurate accounting for both revenues and expenses, and the establishment of uniform methods and controls.

Our operating organization includes six district managers or superintendents for the six main geographical groups. These men are responsible for plant, traffic, and commercial matters involving their districts, as well as for public relations and general matters concerning the properties in their charge. They are, in turn, responsible for plant conditions and personnel to the general plant superintendent in Columbus; and for traffic conditions and personnel, as well as matters concerning automotive equipment, to the traffic and transportation superintendent in Columbus. On other matters they are responsible to the general auditor or directly to the general manager.

Obviously, the consolidation of these properties into one operating unit permitted considerable operating savings through group supervision, eliminating the necessity for one superintendent or manager for each individual company. Less dependent on consolidation was the rearranging of troublemen so as to assign to each man as much territory as he could efficiently handle. A surprising saving was found possible in this direction.

The control of a number of companies in a compact group permitted the setting up of a small construction and rebuilding gang for each district, while freeing the troublemen for trouble-shooting and one-man jobs alone, thus permitting each of them to cover considerably more territory than was formerly possible.

The traffic savings possible in the small exchanges, which are the main bulk of our business, deserve special attention, for most of them were not due to consolidation of companies, except insofar as large consolidation permitted the financing of improvements necessary for the accomplishment of some of them.

We found a number of cases where an exchange of 100 or 200 telephones was located in a rented space in an office building, usually on the second floor. In these cases we leased as soon as possible, a small residence as close to the old location as could be secured, and put the exchange on a uniform agency contract basis. Usually in cases of this kind there is little or no increase in rent.

If possible, the agency was offered to one of the operators already employed. An agent is most desirable who has a widowed or unmarried sister or daughter. This combination is ideal, for with both girls living on the premises, working hours can be arranged between them to the best advantage, and they can employ one or two others to complete the day on the most advantageous basis to the agent in charge.

One rather extreme instance of the kind just described permitted us to reduce the operating cost of a small exchange a little more than $1,000 a year. The cost of moving to the new location was $1,100. Other savings of small amount have been accomplished in similar cases, but with over 140 small exchanges to work on, the possibilities of savings presented can be readily seen.

The elimination of other small exchanges by trunking them in to larger

nearby exchanges presents other interesting possibilities. In five cases of this kind in Ohio last year, we were able to do the work at a very small expense. In none of these cases was the extra operating load on the exchanges to which our subscribers were trunked such that the number of operators required was increased.

A number of our companies when taken over employed a combination bookkeeper, billing clerk and collector. As the general books were moved to Columbus and the billing was moved to one of three centralized billing offices in Ohio, these employes were relieved of a large part of their duties; and by installing windowed partitions or counters in the operating rooms so that the operators could handle the collections, additional savings were accomplished. The costs of such changes were nominal.

As the bookkeeper was usually an experienced operator, she was in most cases re-employed as an operator, and the operator youngest in point of service released. In the Columbus office each bookkeeper handles the books of about seven small companies, while in the three centralized billing offices we have an average of less than one employe for each 2,000 accounts, so that the overall expense was considerably decreased.

At one of our larger exchanges improvement in net earnings sufficient to provide for the investment in equipment for improved service was obtained by the replacement of an obsolete type common battery board with the latest improved type. At the same time the central office was moved into a company-owned building of modern construction.

Although that company is still not earning an entirely adequate return on its entire plant value, nevertheless the savings accomplished in this case, combined with increased earnings from store and office space rents in the new building, were sufficient to provide an attractive return on the total amount of new money required for the improvement.

During the coming year we have plans for the replacement of a number of old magneto switchboards with modern common battery equipment. These replacements will be on exchanges of 700 or more subscribers, and in most of these cases we expect to prove-in the cost through a combination of traffic savings and increased revenue from common battery rates.

We expect to accomplish further savings in plant maintenance through a heavy rebuilding program this summer, which will enable us to enlarge the territory of individual troublemen in some cases, releasing others for construction work or other duties.

The subject assigned to me deserves more thorough treatment by a better analyst than myself. I have merely touched a few high spots. What I have mainly tried to bring out is that many means of increasing the net earnings are possible at minor capital cost and are not dependent on the fact that the properties may have been consolidated under one ownership.

The other thought I wish to leave with you is that the true operator cannot stand still and just "operate" his property, but must see it constantly improving, so that capital may be attracted to his business as needed.

Telephone development is too rapid, and obsolescence too much of a factor, for the Independent industry to keep up with developments out of earnings alone, and outside capital must be relied upon, as has been proved necessary in all other utility lines.

District Meeting at Jacksonville, Ill.

Plant Conference Features Discussions on Increasing the Revenue in Small Exchanges and Testing of Subscriber's Loops and Stations—Traffic School Attended by 60 Operators—Total Attendance of 153 Persons From 32 Towns

The spring district meeting of the Illinois Telephone Association was held in Jacksonville, Wednesday, April 23, with the Illinois Telephone Co. as the host. Exceptionally fine meeting rooms, a good program and an excellent noon luncheon arranged by J. H. Dial, general manager of the host company, all contributed to the success of the conferences.

"There are just two classes of prospects for telephone service—those who have it and those who have not," said Walter Knowles of Clinton, who spoke on the development of small exchanges. Mr. Knowles stressed the necessity for selling service, and urged every employe to come into the sales organization of his company. Thus only, he said, can the telephone business be kept progressive.

He pointed out that those who already have telephones may need additional service; and those who have not, surely need some service. He suggested ways of extending the business, calling on new families who move into the community, advertising the long distance accommodations for visitors, etc.

The men's conference was held in the American Legion home's dining room, while the operators held their traffic conference and school in the ballroom on the second floor.

Louis Pitcher, Dixon, president of the Illinois association, opened the session in the morning with a brief address, expressing his confidence in the future of the telephone industry, and especially in the future of the small exchange. It was brought out, however, that wide-awake business methods and good salesmanship must be used in the small exchange if it is is to continue successfully.

The conference adjourned at noon to the Central Christian Church where a luncheon was served, and a short program was enjoyed. Mayor John Reeve welcomed the delegates, and Rev. M. L. Pontius gave a splendid short inspirational talk. An orchestra from the Illinois School for the Blind furnished music during the dinner hour, and several vocal numbers were given by Miss Rhoda Olds with Miss Mary Newman as accompanist.

The afternoon sessions started promptly at 2:00 p. m. The plant conference was opened with a discussion of the testing of subscribers' loops and stations in magneto exchanges by the transmission engineer of the Illinois association, T. DeWitt Talmage. This talk was presented with the aid of several diagrams and charts showing the principal points of interest in a simplified testing plan which was advocated for use in all magneto plants. This same address under the title of "A Simple Service Survey for Magneto Plants," was awarded first place in TELEPHONY's annual plant article contest of this year.

Secretary A. J. Parsons, of the Illinois association, gave a very fine talk about the activities of the association. He especially emphasized the desirability of the telephone companies cooperating with the state highway department and the state highway police. He introduced a new bulletin on central office maintenance practices covering the "Maintenance of Distributing Frames." This pamphlet was made up of 10 brief, yet thorough, sections and is one of the most complete publications of its kind now available.

After a little discussion concerning the bulletin, it was the sense of the meeting that this new bulletin covered a very interesting and heretofore much neglected subject, and its use was highly recommended to all central office repairmen.

The traffic school was of special interest by reason of the fact that the operators took such a personal interest in the program. So many questions were asked and such interest was displayed that the meeting was held overtime to allow all delegates a chance to participate in the discussions.

The meeting was opened at 10:00 a. m.

The Spring District Meeting of the Illinois Telephone Association Held in Jacksonville on April 23 Was Unusually Well Attended. Some 32 Towns Being Represented. General Manager J. H. Dial, of the Illinois Telephone Co., Which Was the Host Company for the Day, Was Largely Responsible for the Fine Arrangements That Made the Meeting So Successful.

by Mrs. Mayme Workman, traffic supervisor of the association. This was followed by an address of welcome by J. H. Dial, general manager of the host company. The remainder of the morning session was devoted to intensive discussions on voice technique, ticket record work demonstrations and routing instructions.

The afternoon session was opened with a very interesting talk on accuracy in timing by Mrs. Workman. Walter G. Printy, service engineer of the Illinois Commerce Commission, spoke briefly on the duties of the commission from the standpoint of the traffic department of a telephone company. The rest of the afternoon was given over to round table discussions for local operators, toll operators and tributary operators. Many points of interest were brought up and thrashed out in these informal discussions in which every operator took part.

Appropriate songs were sung at the opening and closing of the traffic school. The girls enjoyed this part unusually well and entered into the spirit of the songs to such an extent that additional songs were sung with such volume that the men's conference on the lower floor suspended business for the time being to enjoy the entertainment.

In the traffic school alone there were 12 companies from 25 towns represented by 60 operators. The total attendance was 153 delegates from 32 towns within a driving distance of 50 miles from Jacksonville.

Because the meeting was held in the middle of the spring construction activities, special invitations were sent to the manufacturers, jobbers and supply dealers to have their companies represented at the meeting for the purpose of cooperating with the telephone companies in supplying material for construction and improvements.

The programs of the two conferences were carried out to the letter and were as follows:

MEN'S CONFERENCE

"Glad You're Here," by J. H. Dial, general manager, Illinois Telephone Co., Jacksonville.

"Why and How to Advertise," by Louis Pitcher, president, Illinois Telephone Association, Dixon.

"Development of Small Exchanges," by W. D. Knowles, general manager, Illinois Central Telephone Co., Clinton.

"Testing Subscribers' Loops and Stations," by T. DeWitt Talmage, transmission engineer, Illinois Telephone Association, Springfield.

"Association Activities," by A. J. Parsons, secretary-treasurer, Illinois Telephone Association, Springfield.

Open forum.

TRAFFIC CONFERENCE.

"Voice Technique," by Miss Florence George, voice instructor, Illinois Bell Telephone Co., Springfield.

"Ticket Record Work," by Miss Irene Goodall, traffic supervisor, Illinois Telephone Co., Jacksonville.

"Routing Instructions," by Mrs. Loretta Cusick, traffic supervisor, Illinois Bell Telephone Co., Springfield.

"Accuracy in Timing," by Mrs. Mayme Workman, traffic supervisor, the Illinois Telephone Association, Springfield.

"Local Operators," by Miss Gladys Hamilton, chief operator, Illinois Telephone Co., Jacksonville.

"Tributary Operators," by Miss Leah Cowper, chief operator, Illinois Telephone Co., Winchester.

"Toll Center Operators," by Mrs. Lulu McKee, chief operator, Illinois Telephone Co., Jacksonville.

The next district meeting will be held in Marseilles, La Salle county, on Wednesday, May 28, starting promptly at 9:30 a. m. A full day's program has been arranged for the traffic school at the men's meeting.

The feature discussion in the plant conference will be on the subject of the "Correct Planning of the Outside Plant in the Small Exchange." Because of the large amount of reconstruction going on in Illinois, this subject is particularly timely.

This information will be given by two experienced planners of local exchange plants and promises to be one of the outstanding talks of the year. All Illinois companies within 50 miles of Marseilles are invited to bring all of their operators and other employes who can be spared, for there will be something of interest for everybody.

A. T. & T. Bond Issue 70 Per Cent Converted to Stock.

Only $65,800,000 of the $219,000,000 American Telephone & Telegraph Co. 4½ per cent convertible bonds, due in 1939, remained to be converted into common stock at the close of business on May 14, showing that 70 per cent of the original issue had been exchanged for stock.

On the basis of $100 of bonds and $80 in cash for one share of stock, $122,560,000 in cash has been received by the company since the beginning of the year and $153,200,000 par value of capital stock has been issued, raising the number of shares entitled to rights to above $14,880,000.

Telephony and the Vibrations of Sound

Here Is Presented Part I from the Chapters on Sound in the Forthcoming New Volume, "Telephone Theory and Practice," Parts of Which Are Being Given Advance Publication in "Telephony"—Discussion on Sensation and Disturbance

By Kempster B. Miller

The word "sound" as used in acoustics has two closely related, but distinct, meanings—one introspective, physiological and psychlogical, and the other subjective and physical. One relates to a sensation, and the other to the cause of it.

In the first sense, sound is something entirely within us. It is the *sensation* occuring in the organs of hearing. In the second sense, sound is something that comes to us from without. It is purely physical, and may be defined as a *disturbance* in the air or other media consisting of a succession of alternate waves of compression and rarefaction that tend to travel outwardly in all directions from the sounding body.

Under the first or physiological meaning there would be no sound if the disturbance in air was of such a nature as not to be perceived by the ear; neither would there be sound in the case of an explosion with no ear within range to hear it. Under the second or physical meaning, any periodic vibrations of air would constitute sound, whether of such character as to be perceived by the ear or not, or whether within reach of an ear or not. Under this second meaning, therefore, we have both audible and inaudible sounds.

Often, in an effort to avoid confusion between these two meanings of the same word, an attempt is made to use one of them to the exclusion of the other. Such attempts seem inevitably to lead to trouble, as when a writer, after defining sound as the "sensation perceived by the ear," proceeds in the next paragraph to speak of the "speed at which sound travels through air." The fact is that both of these meanings are well established in our language and the context will usually leave no doubt as to which is intended. In telephony we are vitally concerned with both these phases of sound definition.

From the physiological and psychological aspect we are interested in the capability and the behavior of the ear and the brain in perceiving and in interpreting vibrations of different characteristics.

From the physical aspect we are concerned with the study of the sound waves themselves. It is with this latter aspect that the present chapter will particularly deal, the consideration of the sensation of sound being specifically treated in other chapters.

It is the function of the telephone to transmit sounds to points distant from the source. Strictly speaking, this definition is not quite accurate. With the electric telephone, the sound waves are not actually transmitted over the wires or other media, but, instead, the process is one where the energy of the originating sounds is transformed into electrical energy, which, in turn, is transmitted to the desired destination, and there converted back into sounds more or less closely resembling the original.

It would be more correct to say that it is the function of the telephone to reproduce sounds at points distant from their source. However, the somewhat loose use of the word "transmit," as involved in such expressions as "the electrical transmission of speech," has become a fixture in the language of the telephone. While less exact, it is more descriptive.

Two branches of physics are primarily involved in the electrical transmission of speech and music—those of sound and electricity. There has been no lack of appreciation of the fact that the problem of telephony is largely an electrical problem, but until recently there seems to have been some failure to appreciate that back of that it is fundamentally a problem of acoustics, the science of sound.

We have long accepted Alexander Graham Bell's statement, that it was his greater knowledge of sound than of electricity that led him to invent the telephone, but until recently we have let the obvious lesson contained in that statement go unheeded. Bell did not solve all of telephony's problems of acoustics any more than he did all its problems of electricity, mechanics or business; yet, for the most part, telephone workers have devoted their attention to these other things, with too little regard for the science of sound.

Fortunately, this condition is now rapidly being remedied. In addition to the fine scientific investigations which have been conducted from time to time, largely by institutions of learning, there has been, in recent years, an intensive attack by telephone people on the problems of acoustics, with particular relation to the art of sound reproduction. The results have already been striking. Recently the phonograph has been revolutionized, and great improvements have been made possible in telephone communication. The improvements in telephony have resulted not only in better quality and a greatly extended range of transmission, but in large economies as well.

The waves emanating from a sounding body tend to progress outwardly in all directions from the source. In a uniform medium such as still air, the wave front is in the form of a constantly-expanding sphere with the disturbing point at its center. While the wave front tends to move outwardly in all directions like the surface of a toy balloon that is being inflated, we must avoid the idea that the air itself actually has any such progressive movement. It is only the wave that progresses outwardly, the air particles themselves merely partaking of a small to-and-fro motion in directions coinciding with the radii of the sphere.

This idea of small longitudinal vibrations of the air particles resulting in a series of progressive waves is sometimes rather difficult to grasp. In his characteristic manner, Tyndall, in giving first ideas concerning longitudinal wave propagation, used the following quaint illustration in the first of his classic lectures on sound:[1]

The possession of clear fundamental ideas is so important that I propose to illustrate the propagation of sound by another homely, but useful, experiment. I have here five young assistants, A, B, C, D and E, placed in a row, one behind the other, each boy's hands resting against the back of the boy in front of him. E is now foremost, and A finishes the row behind.

I suddenly push A; A pushes B, and regains his upright position; B pushes C; C pushes D; D pushes E; each boy, after the transmission of the push, becoming himself erect. E, having nobody in front, is thrown forward. Had he been standing on the edge of a precipice, he would have fallen over; had he stood in contact with a window, he would have broken the glass; had he been close to a drum-head, he would have shaken the drum.

We could thus transmit a push through a row of a hundred boys, each particular boy, however, only swaying to and fro. Thus, also, we send sound through the air, and shake the drum of a distant ear, while each particular particle of the air concerned in the transmission of the pulse makes only a small oscillation.

But we have not yet extracted from our row of boys all that they can teach us. When A is pushed, he may yield languidly, and thus tardily deliver up the motion to his neighbor, B. B may do the same to C, C to D, D to E. In this way the motion might be transmitted with comparative slowness along the line. But A, when pushed, may, by a sharp muscular effort and sudden recoil, deliver up promptly his motion to B, and come himself to rest; B may do

[1]Sound, John Tyndall. D. Appleton and Company.

the same to C, C to D, and D to E, the motion being thus transmitted rapidly along the line.

Now, this sharp muscular effort and sudden recoil is analogous to the *elasticity* of the air in the case of sound. In a wave of sound, a lamina of air, when urged against its neighbor lamina, delivers up its motion and recoils; and the more rapid this delivery and recoil, or, in other words, the greater the elasticity of the air, the greater is the velocity of the sound.

The arrangement of balls and springs suggested in Fig. 26 is of further help toward a conception of the way in which a pulse travels through an elastic medium. The row of solid balls are each supported on a resilient rod, each ball being separated from its neighbor by a coiled spring. When the left-hand ball is forcibly moved to the right by a blow of the hammer, it flexes its supporting spring and compresses the spring at its right.

This compression in the first coiled spring will cause a movement of the second ball toward the right, which, in turn, will compress the second coiled spring, and so on, a wave of compression going down the line of balls toward the right until finally the last ball is moved and taps the knuckle of the hand waiting to receive the sensation.

Here the elasticity of the springs corresponds to that of the air, and it is clear that the stiffer the springs (the greater their elasticity), the faster will be the progress of the impulse. Also, the mass of the balls correspondents to the density of the air, and obviously the heavier the balls, the slower will be the progress of the impulse. In such an arrangement with fairly heavy balls and springs that are not too stiff, the progress of the impulse may be followed with the eye.

Again, after exploding a small gas balloon, Tyndall called to the attention of the audience the fact that they had all heard the sound, but that no particle of the air from the vicinity of the balloon had reached the ear of any person present. Concerning this, he says:

Scientific education ought to teach us to see the invisible as well as the visible in nature; to picture with the vision of the mind those operations which entirely elude bodily vision. With regard to the point now under consideration, we must endeavor to form a definite image of a wave of sound. We must be able to see mentally the air particles when urged outwards by the explosion of our balloon crowding closely together; the particles immediately behind this condensation being separated more widely apart.

We must, in short, be able to seize the conception that a sonorous wave consists of two portions, in the one of which the air is more dense, and in the other of which it is less dense than usual. A condensation and rarefaction, then, are the two constituents of a wave of sound.

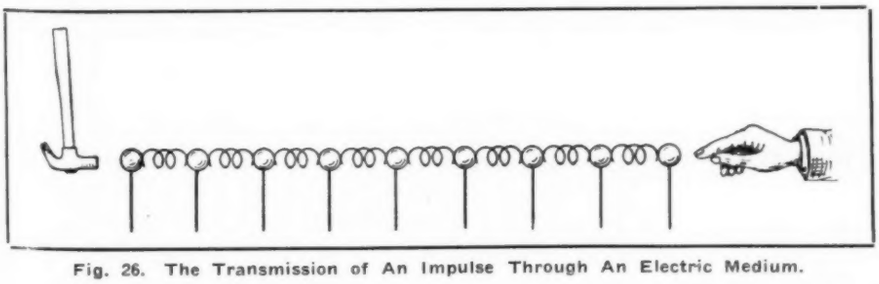


Fig. 26. The Transmission of An Impulse Through An Electric Medium.

So far we have dealt apparently with but a single disturbing impulse—the push given to one of Tyndall's "young assistants," the "pop" of his tiny balloon or the blow of the hammer of Fig. 26.

Experience teaches us, however, that when such single disturbances occur in an elastic medium they produce not one wave, but a series of diminishing waves which either rapidly or slowly die away, in much the same way that a pebble thrown into the water produces not one wave, but a train of them, each one smaller than the one before it. In the case of the "pop" caused by the exploding balloon, the train of waves died out so rapidly as to leave only a single sudden sensation upon the ear.

As an example of a wave train that does not die out so suddenly, but is maintained for a considerable period, because the sounding body continues in action, we may take the tuning fork shown in Fig. 27. When the fork is set in motion it continues its vibrations and thus creates a succession of waves which pass through the air to the ear. The alternating waves of compression and rarefaction are indicated in this figure by the varying degrees of closeness of the vertical lines intervening between the fork and the ear.

In the case of this long continued series of waves, the ear would sense what we call a tone; and here we may observe a distinction in terminology. The sound of the exploding balloon was a "noise"; that of the tuning fork, a "tone," a distinction that will be referred to later.

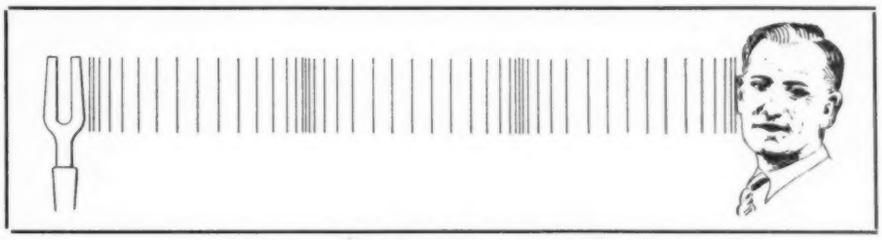


Fig. 27. The Transmission of Sound Waves in the Air.

That it takes sound an appreciable time to travel over considerable distances is a matter of commonplace observation. The time elapsing between a flash of distant lightning and the resulting sound of thunder is perhaps the most familiar example; another is that the steam from the whistle of a locomotive half a mile away may be seen some seconds before the sound is heard. The lightning flash and the sight of the steam reach us at the enormous speed of 186,000 miles a second, while the sound of thunder or that of the whistle comes creeping along at snail's pace, comparatively.

The speed at which sound waves travel depends on the character of the medium through which they pass. Except, perhaps, in the case of violent explosions[2], all sounds travel at equal speed in a given medium. Unless this statement were true, the widely different sounds of the various instruments of a brass band would reach the listener several hundred yards away in different sequence from that in which they occurred, with disastrous effect from the musical standpoint.

More specifically, the velocity of sound depends on two characteristics of the medium—its density and its elasticity. The velocity increases directly as the square root of the elasticity, and decreases directly as the square root of the density. In the atmosphere, changes in barometric pressure produce no effect on the velocity at which sound travels, so long as the temperature remains the same, the reason being that an increase of pressure increases both the density and the elasticity of the air in the same proportion, and *vice versa*.

Hence it is that on mountain tops and at sea level the velocity of sound remains the same if only the temperature does not change. An increase in temperature of free air, however, decreases the density of the air without affecting its elasticity, and thus an increase of temperature is accompanied by an increase of the velocity. Hence, in order to determine velocity of sound in the atmosphere, we are not concerned with barometric pressure or with elevation, but only with the temperature.

Sound travels faster in solids than in air, but this is not because of the greater

[2]Ganot's Physics. Translated by Atkinson. Seventeenth edition, p. 218. Textbook of Sound. Barton. London, 1908, pp. 513-553.

density of the solid, as might be assumed. That, in itself, would reduce the velocity. The greater velocity in solids results from the fact that in these bodies the increase of elasticity over that of air is in greater proportion than the increase in density.

At just freezing temperature, 32° F., sound has a velocity in free air of 1,090 feet per second, and at 70° F., of about 1,132 feet. Starting with 1,090 feet at freezing point, it is a fairly close approximation to say that the velocity increases about 1.1 feet per second for each Fahrenheit degree of rise, or nearly two feet per second for each Centigrade degree of rise.

For the purpose of telephony, we are mainly concerned with air as the medium through which sound reaches us. We are constantly submerged in air, and cannot live without it. Any sounds which reach our ears through other media are of distinctly minor importance. But the sounds which come to us through the air are of almost infinite variety, ranging from faint to loud, low to shrill, harsh to sweet, from the rumble of distant thunder to the chirp of a cricket, from the simple hum of a tuning fork to the complex crash of an orchestra and from those which give pain to those which give pleasure.

How may we characterize this apparent chaos of differences?

Obviously the speed at which the sounds travel has nothing to do with it, since it has just been shown that nearly all sounds pass through a given medium at the same velocity. The answer, on the surface, is surprisingly simple. Sounds differ from one another in three characteristics only: *pitch, loudness* and *quality* or *timbre*. Each of these, in turn, depends on comparatively simple conditions, or combinations of conditions, the principles of which are not difficult to understand.

As a preliminary to the discussion of these characteristics of sound we may consider briefly the subject of simple harmonic motion. This may appear at first to be a digression, but in reality it is the most direct approach to the subject.

(*To be continued*)

Kansas Has "Best Ever" Convention

Recent Annual Meeting of Kansas Telephone Association in Topeka Declared the Largest and Best Convention Ever Held—Spirit of Goodwill Manifest—Women's Section Organized With Much Enthusiasm—Report of Proceedings

The 30th annual convention of the Kansas Telephone Association was held in the Hotel Jayhawk in Topeka, Kans., on Tuesday, Wednesday and Thursday of last week, May 13, 14 and 15. It was unanimously conceded to have been the largest and best convention ever held.

The success of the convention was largely due to the spirit with which everybody came. There were no "bones to pick" and everybody came prepared to have a good time and to enjoy the instructive addresses and discussions. The exhibitors remarked upon the new and wonderful spirit exhibited by everyone, and they repeatedly said that it was one of the best conventions they had ever attended.

The program was exceptionally good and each speaker covered his subject in an interesting and instructive way. Every session was attended by at least 250 people and they enjoyed it to the utmost. The total attendance at the convention was 342.

Women's Division Organized with Much Enthusiasm.

The ladies' session held on Tuesday, May 13, under the personal supervision of Elliott Belden of Abilene, and under the leadership of Miss Manta J. Elder, as chairman, was a new departure in the association's work and was declared a wonderful success.

This entertaining of the ladies and the organization of a women's section of the Kansas Telephone Association was for the purpose of arousing interest in the telephone industry among the employes of the smaller companies by making them a part of a big organization. It was felt that in the case of the small companies, surrounded by the exchanges of the larger companies, the operators had no incentive to work and improve themselves, feeling rather isolated and unimportant in the industry. The association is anxious to make them realize that each operator in the smallest exchange is just as important to the industry as the operator in the largest exchange, if uniform state-

"Present-Day Competition," Says President Tucker, "Is Not from Within, It Is from Without, and That Which the Public Thinks Is the Greatest to Be Desired, Gets the Dollar."

wide service is to be maintained. The program for the ladies' session was enthusiastically received.

In the election of officers for this new women's organization Miss Catherine McGinnis, of Horton, was chosen president and Miss Gladys Hall, of Burlingame, was chosen secretary. The publicity agents previously appointed were made publicity agents for the women's section.

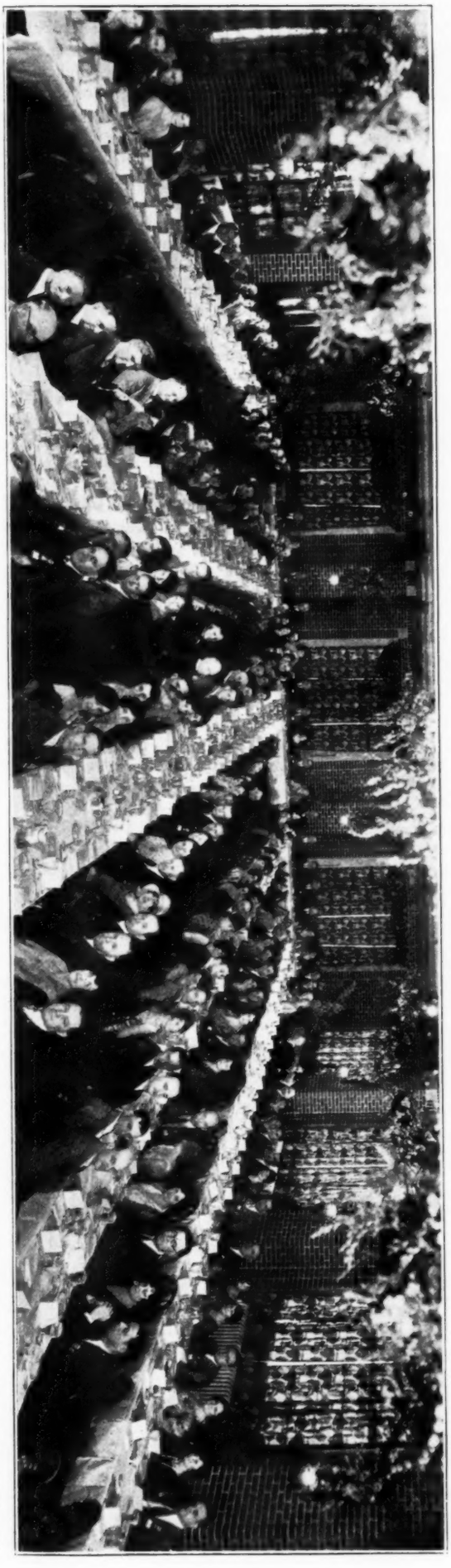
Better and faster service was the keynote of the new women's division. A major part of the program was spent in a discussion of ways to improve telephone service.

Elliott Belden, advertising manager of the United Telephone Co., Abilene, stressed the importance of cheerful service as a business builder for the telephone companies. He pointed out that the operators came into personal contact with the customers daily and that their opportunities for building goodwill were unlimited.

P. P. Cheatham, toll traffic supervisor of the Southwestern Bell Telephone Co., Topeka, outlined a number of technical shortcuts whereby the operators should be able to speed up long distance calls. Mr. Belden then read a paper on telephone progress by Miss Anne Barnes, traveling chief operator for the United States Independent Telephone Association. Fred Coulson, general manager of the United Telephone Co., Abilene, talked on the "Romance of the Telephone Business."

A two-act comedy presented by four employes of the United Telephone Co., Salina, was one of the features of the afternoon program. Members of the cast presenting the comedy were Miss Ione Rubin, Miss Alice Wagner, Miss Clara Curry and Miss Mary Burgess. Miss Burgess gave a tap dance. The accompaniment was played by Mrs. Ruth Fleisher, Topeka.

At 6 p. m. the ladies were entertained on the roof garden of the Hotel Kansan at an informal dinner given them by the Southwestern Bell Telephone Co., with Miss Henrietta Morrissey, chief operator in Topeka, presiding. After a wonderful dinner in the setting of the roof garden with the tables filled with beautiful peonies



A Most Enjoyable Time Was Experienced by the 250 Men and Women Who Attended the Banquet and Dance on the Roof Garden of Hotel Jayhawk During the 30th Annual Convention of the Kansas Telephone Association, Held in Topeka Last Week—Keen Interest Shown in Excellent Program Presented at Convention Sessions—21 New Members Added Since January 1

furnished by L. F. Duggan, Southwestern Bell Telephone Co., from his own garden, the ladies listened to short addresses by Miss Carrie Lee Thomas, instruction supervisor of the operators' school in Kansas City, Mo., and Miss Stella Henderson, chief operator in Pleasanton, Kans., and impromptu talks by several others. The meeting broke up about 8:45 p. m., after which the ladies attended a theater party as the guests of the Topeka Chamber of Commerce.

Men's Session Tuesday Afternoon.

In the meantime the men were holding their own session on Tuesday afternoon in the convention hall, with President Samuel Tucker presiding. The meeting was opened by an invocation by Dr. George William Allison, pastor of the First Presbyterian Church of Topeka, and was followed by an address of welcome by Mayor W. O. Rigby, of Topeka.

Secretary A. R. MacKinnon then presented his report to the convention. He recalled to mind the rather stagnant condition of the organization when he arrived upon the scene of action January 1 of this year. The membership had fallen off due to lack of interest on the part of the smaller companies during the period of wholesale buying and selling of the past two or three years.

Then came the stock market crash in 1929, the tightening of ready money and the cessation of buying of telephone properties. Whereupon the smaller telephone companies found themselves in greater need than ever of the assistance of the Kansas Telephone Association to help get them onto a business basis. The association then decided to extend its membership to include all telephone companies desiring to join the organization.

Mr. MacKinnon stated that since he assumed his new duties the first of the year he has had the most hearty cooperation on the part of everyone engaged in the telephone industry in Kansas, and many outside of the state. Dues have been paid by practically all last year's members, two members have been lost by purchase and 21 new members have been secured.

A state-wide organization has been created for the purpose of holding district meetings and the first series has been held, reaching 442 telephone people and training 202 operators.

Mr. MacKinnon stated that his office has rendered assistance to many companies in the solution of their local difficulties and has cooperated with the public service commission in the dispensing of justice. In conclusion, he said:

"There are eight months left of the year 1930 and we hope you will help in making them just as full of activity as the first four months. This association is your association and cannot be any more active than you are active, and the results we obtain are absolutely dependent upon the interest shown by you and the work you do."

Mr. MacKinnon then read the report of the treasurer, V. E. Chaney, Kansas City, Mo., which showed the association to be in a very satisfactory financial condition. The business session was closed with the appointment of nominating and resolution committees.

A very interesting talk was made by E. R. Stonaker, consulting traffic engineer of the Stromberg-Carlson Telephone Mfg. Co., of Rochester, N. Y., on the subject "Furnishing Modern Telephone Service to a Small Community at a Profit." With modern development of the electric light and power industry, he declared that the small exchange is now able to render satisfactory service to the community and to do it at a profit.

The concluding number of the opening session of the convention was a demonstration by Messrs. Hilliard, Ritchie and Covey, of the Southwestern Bell Telephone Co. at Kansas City, Mo., showing the effects of lightning upon telephone lines without adequate protection and also the effect of improper clearances of electric power lines and telephone lines, which was very instructive and well received. In the evening the men were free to attend the theater party with the ladies or enjoy themselves otherwise.

The officers of the association, the members of the executive committee and the nine district chairmen met at breakfast in the Hotel Jayhawk at 8 o'clock Wednesday morning to discuss in detail future plans for the association and the various activities of the organization.

General Session Wednesday Morning.

The session Wednesday morning, May 14, in the convention hall was a general

session for both men and women and was presided over by President Samuel Tucker.

The first address was a very interesting one given by C. H. Montgomery, commissioner of the Kansas Public Service Commission. Excerpts of it follow:

"We are concerned in your financial structure because if you are not adequately financed you may be unable to meet the demands made on you for service, maintenance may suffer, extensions of lines to serve new subscribers may be deferred. Further, you may have ample capital to meet all the real requirements of your business but be handicapped by over-capitalization, sometimes referred to as watered stock, and in the struggle to pay interest and dividends on excessive capitalization, your telephone operations may suffer.

Your rates may be so low that you are unable to properly operate and maintain your property, or they may be so high that subscribers rebel and go without service rather than to submit to excessive charges. Another company may be invading the territory occupied by you or you may be casting envious eyes on some other company's territory. There may be line interference which you have been unable to correct and adjust with other companies concerned.

We are concerned with all these things; we are concerned with anything which may interfere with good service to subscribers and with anything that may improve service.

The interests and aims of the telephone companies and the public service commission should go along together in making available to subscribers adequate service at reasonable rates."

Following Mr. Montgomery's address a very inspiring and instructive talk was presented by C. P. Brewer, director of salesmanship and personal development for the University of Kansas. With his wonderful manner of presentation he called attention to the six major points in salesmanship and impressed upon everyone present the need for going after business. His talk was considered by everybody to be the best of its kind they had ever heard.

An extremely interesting and instructive demonstration of "Multi-Switch Operating," by P. P. Cheatham, of Topeka, was the next feature. With the aid of five large charts of five connecting companies, electrically connected, and operated by five telephone operators, Mr. Cheatham demonstrated all the various types of calls included in the multi-switch operating necessary in order to complete a call of the subscriber through five exchanges to another subscriber.

Wednesday Afternoon Session.

The afternoon session was opened with the presentation of the president's address. President Samuel Tucker, of the Pleasanton Telephone Co., Pleasanton, reviewed the past history of the development of the telephone in Kansas as a background to the present structure of the Kansas Telephone Association. His address follows in part:

President Tucker's Address.

"Although the telephone is over 50 years old and naturally being in service in the principal cities of the eastern part of the United States, its progress westward was slow. The principal cities of Kansas were served by small telephone exchanges up to the beginning of this century, but soon after the year 1900 the telephone population of Kansas began to grow.

In 1901, 1902 and 1903 there were very few experienced telephone men in Kansas outside of the few cities where exchanges were being operated but amateur linemen and managers and financiers were quite willing to make the venture in this original expansion of the telephone business, especially in the small towns and villages.

The rural districts generally provided their own telephone service and applied their own ingenuity in making their telephones talk, many original ideas were put to use, but generally a form of open wire construction was used and the enterprising capitalist in each community fully expected to make some easy money in the telephone game.

The meaning of such terms as depreciation, obsolescence, etc., was unknown. No accounting system was needed for the manager simply collected the rentals and paid the bills and that was all that was necessary, the telephone business grew just like 'Topsy.'

By 1905 exchanges had been built in every village in Kansas, rural lines had been built connecting all farmers to these exchanges. Free service lines connected all exchanges.

Cedar poles were cheap, hedge poles were cheaper. Many makes of telephones and switchboards were in service, whose manufacturing names have been lost and forgotten. The price of No. 12 iron wire was three to three and one-half cents per pound. A five-bar magneto telephone with a pair of dry cells cost $10 to $11 each; a piece of wire or an end gate rod was used for the ground. The labor cost in building and operating the plant was $25 to $40 per month. The switchboard operators in the small towns received five cents per hour, and worked ten hours per day.

Based on the low cost of labor and material and the simple plan of construction, the service to the public did not cost much. Taxes were very low and depreciation and obsolescence had not appeared. There was no engineering cost, no accounting service, no traffic department or any other division. The business was very young and growing very fast. Free service between the smaller and sometimes larger exchanges was given as a regular rule; dividends were a regular thing the first years.

Some companies, seeing the danger ahead, raised their rates and discontinued the free service between exchanges. This nearly always brought competition in the form of another telephone exchange in the town, for there were plenty of manufacturers willing to work up a mutual exchange in order to sell material. And generally, if a mutual was not organized, there were more amateur financiers and managers to do the organizing in order to make a fortune in this new business.

Soon most of the towns in Kansas had competition; the general public had the feeling that telephone service was cheap, and that there was big money in it. Merchants were compelled to pay for two or more telephones connected with the competitive exchanges in order to do business and if you had only one telephone and desired a person who was on the other exchanges, it was just too bad.

This competition between exchanges and companies soon became a fight that developed into a fight to the finish, the survival of the fittest. This competitive period had started in enthusiasm and ignorance, for many jumped into a business that they knew nothing about with an enthusiasm that carried them far, for the amateur telephone people and the public all agreed that it was a gold mine.

After about 10 years of this competition and experience, conditions had become unsatisfactory to both the public and the telephone people; the service was becoming poor and the telephone companies, after a long fight were resorting to all sorts of methods in order to survive. At this period, in 1912, the public service commission was organized and took legal charge of all operations of commercial companies, but not mutual companies.

Dividends had ceased, depreciation had seriously set in and the damage of telephone competition had become apparent. It was at this time, with the advent of public service regulation, that all rates for service were made permanent in this low competitive condition and could not be changed except with the consent of the commission, which meant court hearings.

The struggle of this new utility to get rid of competition, replace old equipment, keep up with the demand for additional subscribers, raise rates so as to care for depreciation, obsolescence and the cost of consolidation was getting under way in 1914. The public service commission, being politically-minded naturally took heed of the general public impression of the cheap cost of service and any adjustment of rates meant a legal struggle that often ended in the state supreme court before the telephone company could win.

Although the United States did not enter the World War until after the struggle had continued two years, the rising cost of both labor and material had become a great factor in the effort of the

telephone industry to become a going concern in a healthy condition. The constantly-increasing demand for better service caused the changing of exchanges from magneto to common battery, the installation of lead-covered cable in the cities and towns and many other improvements which forced the addition of much new capital.

The United States entering the World War in 1916 put a stop to the efforts of all telephone companies to reach a normal basis of finance when our government assumed the operation of our telephone properties. The rates remained the same, especially in the smaller exchanges; the cost of both wages and material increased 100 per cent and sometimes more, making it very hard on this young and growing public utility. Great earnings were made in nearly all other branches of industry during the war but the telephone industry gave most of its linemen and telephone experts to its country at a very great sacrifice, and a great number of special operators were sent over seas to operate the army switchboards in France.

The war ending did not decrease the cost of labor and material, but we began again where the war had stopped us in our efforts to become a going concern when along came the depression of 1921. At this time I feel that it would be safe to state, that with our present knowledge of operation of telephone properties, but a small amount of dividends could have been rightly declared in the first 21 years of this century. Especially was this true of smaller companies, for they did not have the means to enter upon a legal struggle with the public service commission for a just rate for its service, with the result that when the period of selling and buying came along—from 1923 to 1929—these owners of small commercial companies and many mutuals sold out to larger concerns.

Competition has been eliminated in nearly all of the cities of Kansas, the competing exchanges either going into bankruptcy or selling out for what they could get. The cost of consolidating these dual exchanges into one exchange has been heavy, but at this time most of the telephone public in the commercial exchanges is being served in an adequate way; the change from magneto to common battery and from common battery service to automatic is still under way; wall sets are being changed for desk sets in the smaller exchanges and desk sets are being changed for monophones in the larger exchanges.

But in the rural district outside of the larger exchanges telephone conditions are such that the old magneto telephone still holds sway, and the old grounded line of No. 12 iron wire serves most of the rural telephones.

After this 30-year period of development the telephone industry is becoming standardized generally over the state in

(*Please turn to page* 44.)

Radio Test Suit Under Anti-Trust Act

Suit Instituted by United States Attorney General to Test Legality of Arrangements Between Radio Corp. of America and Nine Other Companies—Charges Combination in Restraint of Trade—Permanent Injunction Asked

A suit to test the legality of arrangements existing between the Radio Corp. of America, the General Electric Co., the Westinghouse Electric & Mfg. Co., the American Telephone & Telegraph Co., the Western Electric Co. and five other corporations was filed by Attorney General William D. Mitchell in the district court at Wilmington, Delaware, May 13.

The suit, it was stated, is concerned chiefly with the legality of patent arrangements made between the defendants, which has resulted, it is alleged, in placing the control of the radio business and its development in their hands.

The suit of the Department of Justice, charging a combination in restraint of trade in violation of the Sherman anti-trust act, "is instituted to prevent and restrain the defendants from further violating said act," it is pointed out in the petition.

The allegations of the petition detail the history of the alleged combination through its various acquisitions, beginning in the year 1919 and continuing down to the approval by the stockholders of the Radio Corp. of America of the proposed acquisition by that company of radio facilities of the Westinghouse and General Electric companies.

It is claimed in the petition that the combination through its various agreements and its "patent pool," has resulted in a power, lodged in the defendants, to dictate prices and terms to competitors and a control of approximately 95 per cent of all radio apparatus manufactured, sold and used in the United States.

Generally speaking, the government seeks a decree perpetually to enjoin and restrain the defendants "from continuing to carry out, directly or indirectly, expressly or impliedly, the said combination and conspiracy, from monopolization or attempting to monopolize, and from entering into or carrying out directly or indirectly any similar combination and conspiracy and monopolization of interstate trade or commerce."

The government asked that the RCA Photophone, RCA Victor, RCA Radiotron and that General Motors Radio Corp. "be restrained from engaging in interstate or foreign commerce, and that each of them be dissolved."

The petition charged that they had been a party to an "unlawful combination * * * in restraint of inter-state and foreign trade and commerce and that each has attempted to monopolize and is in combination and conspiracy with the other defendants to monopolize part of the trade and commerce among the several states and with foreign nations."

Other demands included:

1. That the combination, conspiracy and monopolization complained of be held in violation of Sherman anti-trust law.

2. That the defendants be perpetually enjoined from performing or continuing to perform any and all other acts described in the petition "as means of creating, maintaining or effectuating said combination and conspiracy."

3. That the contracts and agreements between and among the defendants be declared unlawful and void and that the defendants be perpetually enjoined "from entering into similar contracts or carrying out the terms of said agreements or understandings."

4. That the defendants be perpetually enjoined from agreeing with other defendants not to compete "with such other defendants in any line of interstate trade or commerce."

5. That the defendants, other than the Radio Corp. of America, be perpetually enjoyed and restrained from purchasing or otherwise acquiring capital stock in the Radio Corp. of America, any of its subsidiaries or operating companies.

6. That the General Electric Co. and Westinghouse Electric & Mfg. Co. be ordered to divest themselves of all stock in the Radio corporation and that the Radio corporation be ordered to divest itself of any property, facilities or assets acquired from General Electric or Westinghouse under the recent merger.

7. That jurisdiction of this cause be retained for the purpose of enforcing such decree as may be entered and enabling petitioner to apply for the modification or enlargement of any of the provisions on the ground that the same is inadequate, and for the purpose of enabling the defendants to apply to this court for a modification of the provisions on the ground that it is inappropriate or unnecessary.

WINONA, MINN
The Latest Addition Th

THE exchanges listed below, selected at random from orders received from Independent companies during the last twelve months, illustrate the adaptability of Strowger equipment to the needs of exchanges of various sizes. This list does not include any of the numerous Independent exchanges of less than 100 lines for which orders were placed.

Jamestown, N. Y. (4660)
Albert Lea, Minn. (1900)
Columbus, Nebr. (1200)
Redlands, Cal. (1600)
Laurens, S. C. (500)
Dowagiac, Mich. (700)
Lakewood, N. Y. (200)
Frewsbury, N. Y. (100)
Union City, Mich. (175)
Wingate, N. C. (100)
Kernersville, N. C. (130)
Weekapaug, R. I. (100)
Weldon, N. C. (300)
Roanoke Rapids, N. C. (500)
Clintonville, Wisc. (360)
Chrismar, Ill. (225)
Harvey's Lake, Pa. (150)
Guadalupe, Cal. (100)
Carpinterea, Cal. (210)
Goleta, Cal. (120)
Seward, Nebr. (700)
Ayden, N. C. (120)
Martin, Tenn. (425)

THE order recently received the Telegraph Company for 30 of equipment for Winona, Mi no to the ever-growing Strow Ca to a highly important fact.

That fact is that those companies hav with Strowger Dial operation in th ex opportunity to study its performance ll c are most enthusiastic about converti em soon as conditions permit. The Tri-St hon having had excellent results with St ial Minneapolis, has already cut over A , M operation and arranged for the early ion evidenced by the above-described or

Telephone companies, in making their for study carefully the profitable experie the

Automatic E
Manu
STROWGER AUTOMATIC DIAL TE D SIG
Factory and General Offices: 1033 W Street,
Sales and Service Offi l Citie

GENERAL EXPORT DISTRIBUTORS
The Automatic Electric Company, Ltd., Chicago

In Canada . . . Independent Sales and Engineering Co., Ltd., Vancouver
In Australasia . . . Automatic Telephones, Ltd., Sydn
In Japan . . . Automatic Telephones Ltd. of Japan, Toky

STROWGE
DIAL SY

When writing to Automatic Electric Inc., please mention TELEPHONY.

NSOTA

The Strowger Roll Call

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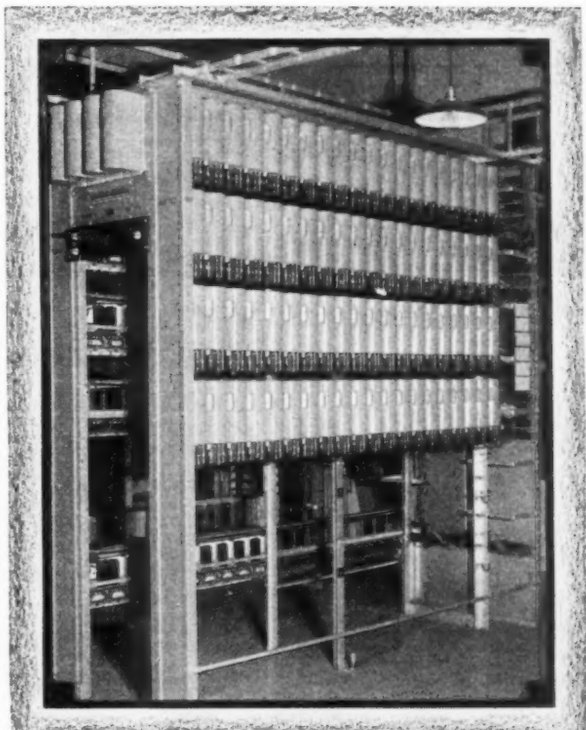
perie their successful contemporaries.



atic Inc.

Manu
IAL TE D SIGNALING SYSTEMS
1033 W treet, Chicago, U. S. A.
rvice Of l Cities

ASSOCIATED COMPANIES

ctric Company, Inc. . . . . Chicago
Automatic Telephone Co., Ltd., London
lephone Manufacturing Co., Ltd., Liverpool
werp Telephone and Electrical
. . . . . Antwerp

GE UTOMATIC
STEMS

Here and There in Telephone Work

Subscribers Suggest Names for New Automatic Office.

A new full automatic office will be placed in service in June by the Home Telephone & Telegraph Co., Fort Wayne, Ind. The name of the new unit will be Eastbrook. This name was chosen from suggestions submitted by hundreds of subscribers or members of subscribers' families in a contest conducted by the Fort Wayne company, from April 7 to April 16 inclusive. The name "Eastbrook" was selected because it best fulfilled all the rules of the contest.

Realizing that subscribers would probably like to name something they were going to use, officials of the company announced the contest in "Home Phone News," the company's house organ. The story was an invitation for all subscribers to participate in a $50 prize contest designed to find a name for the new automatic office. Copies of the house organ were inclosed in the monthly bill envelopes and mailed to all subscribers.

The rules, more difficult than those of the average contest, followed the story. It had been decided that the new office name should begin with "E." "E" is located on the dial between the prefixes "H" and "A," for the Harrison and Anthony offices now in service in Fort Wayne. Undaunted, Fort Wayne subscribers simply opened their dictionaries to the fifth alphabetical division, sought their Bibles and other sources of information and began to search. Immediately the suggestions began to flow in.

The rules of the contest as shown in the Home Phone News, newspaper stories and several advertisements carried in the newspapers, were as follows:

1. Any subscriber to Fort Wayne telephone service, and any member of the family of any subscriber, is eligible to participate in the contest, with the exception of employes of the telephone company and members of families of employes.
2. Only one suggested name may be submitted by each contestant.
3. Each suggested name must be submitted with a letter of reasons why that name should be selected.
4. All letters must be in the hands of the contest committee not later than two days following the announced termination of the contest.
5. The name should begin with "E."
6. The name should consist of more than one syllable.
7. The name should be readily read and pronounced by the average child in grade school.
8. The name should be easily understood over the telephone.
9. The letters, *I*, *O*, *Q*, or *Z*, should not occur as the second or third letters of the name.
10. The name should not sound like a numeral, or like Anthony or Harrison.
11. The second letter of the name should appear on the Fort Wayne dial.
12. The name should be characteristic of Fort Wayne.
13. The name may consist of two words providing the complete name does not consist of more than five syllables.
14. Letters submitted should be addressed to the contest committee, the Home Telephone & Telegraph Co., 303 East Berry street.

The contest closed at midnight, April 16. Fort Wayne subscribers sat back to wait but not patiently. Two days elapsed and many inquiries were made at the office in regards to what name had been selected. Newspaper reporters were daily visitors. The name of the new unit evidently meant a lot to Fort Wayne.

A couple of afternoons later, the contest committee, comprising the head of all the different departments and representatives of the management, gathered for the christening. The chairman of the contest committee, presented the list of suggestors and their suggestions. Several hours later the group emerged from conference, and the new unit had been named.

Prominent among the names submitted in the contest were: Ewing, Enterprise, Erie, Euclid, Edison, Echo, Eureka, East Berry, Edgewater, Elrose, Envoy, Eastwood, Emerson, Easton, Englewood, Eastland, Enwane, East Wayne, East Tower, Eston, Emboyd, Eastfort, Erndale, Ernest, Era, Elmwood, Erdman, Eastend, Energy, East Haven, Eastgate, Ensign, Eel River, Endicott, Evergreen, East Lake and Endeavor.

Of these and many more, Eastbrook best fulfilled the requirements.

Upon receipt of each letter, and there were many, a reply was forwarded back thanking the subscriber for his or her interest in the contest and its purpose. These letters were signed personally by the chairman of the contest committee.

The installation of equipment for the new Eastbrook unit is rapidly nearing completion. It is being installed by the Automatic Electric Inc., of Chicago, Ill. The new unit will correspond in size with the Anthony and Harrison units now in operation. The estimated cost of the new equipment, when installed complete, is approximately $600,000. The new Eastbrook unit is made necessary by the growth of Fort Wayne. It will be placed in the East Berry street building of the company where the Anthony office is now located and will serve within the area now served by the Anthony office only.

Letters Received from Subscribers of Home Telephone & Telegraph Co. in Suggestion Contest for Name for New Fort Wayne Office.

Magneto Exchange Repairman; Driving C. O. Ringing Machine.

By JOHN A. BRACKEN.

There are various methods of driving a magneto exchange ringing machine, such as water motors and direct current electric motors. Where alternating current is available, an induction motor is used. The alternating current induction motor is cheaper than the direct current motor. It will stand a larger overload.

The cost of repairing, when burned out from an overload or other causes, is less than the cost on a direct current motor. The principal point of all is that the alternating current motor practically requires no more attention or expense for upkeep than the old-fashioned grindstone. Two oiling bearings are about the only points of wear.

The operation of an induction motor can be explained by the following: If the

magnetic field poles of a direct current motor are rotated about the armature, induced electromotive forces will be set up in the motor armature conductors; and if the armature conductors are so connected that these induced electromotive forces result in a flow of current, the conductors carrying this current will be acted on by the moving magnetic field, thus producing mechanical torque which tends to rotate the motor armature.

By torque is meant the mechanical rotary, or turning, force which acts on the armature of an electric motor and causes its rotation. In the alternating current induction motor, the magnetic field rotates due to alternating current which flows through the stationary field winding (sometimes called the stator); and this rotating field acts on the short-circuited armature (sometimes called the rotor) conductors, thus inducing electric currents.

These induced currents acted on by the rotating magnetic field produce a torque, which causes the rotation of the motor. While the magnetic field rotates, the field windings themselves are stationary, the rotating field being made possible by the rapidly changing and reversing power line alternating current in the stationary field windings. The alternating electric current goes into the stationary parts of the induction motor only. The troublesome brushes and commutator of the direct-current motor are entirely eliminated from the revolving part of the induction motor.

In all up-to-date ringing machine installations, the motor is connected directly to the ringing generator and they are well insulated from each other. This is accomplished by an insulated disk between two flanges mounted on the revolving shaft between the two machines. Pins on the face of each flange extend nearly, but not quite, through the insulating disk, these pins being staggered to avoid contact. The holding bolts and machine frames are insulated from the foundation base of the two machines.

In other installations the motor is connected to the ringing machine by means of a belt, the belting serving two important purposes: first, the ringing machine is thoroughly insulated from the motor, and should the alternating current power transformer supplying the motor with operating current break down, and thus allow the high voltage power circuit current to flow through the induction motor, it could not find its way to the ringing machine; second, in case any trobule should develop in the ringing machine, such as a short-circuit, the driving belt will slip from the pulley and thereby act as a safety valve, so to speak, and consequently avoid serious trouble.

Leather belting is the most common form of ringing generator motor-drive. Leather belting is made in different weights known as single, double, three-ply and four-ply. Many conditions must be given due weight

A Good Slogan for Any Exchange.

in a determination of the proper belt for each particular form of motor-drive.

The proper selection in weights and thickness of belt is necessary to the most efficient operation of the ringing machine. Generally single belts are used for motor-driven ringing generators, owing to the pulleys being small, the velocity high and the duty light.

The power which a belt will transmit is the product of the tension and the speed, and the power that may be taken is proportional to the arc (any part of a curve forming the segment of a circle) of the belt's contact on the pulley. It is greatest for 180 degrees or one-half the circumference. For an arc of contact of 90 degrees, the power transmitted is about 60 per cent of that of 180 degrees and will increase with the number of degrees embraced.

This is not because of the increased surface but because of the increased pressure per square inch between the belt and the pulley as the surface embraced approaches 180 degrees. However, among the many rules for leather belting, probably the simplest is that which states that a single belt, one-inch wide traveling 800 feet per minute, will transmit one horsepower.

Occasionally it is necessary to replace a ringing machine driving belt, and the length of the new belt is required. Although in actual practice the length of the belt is obtained by measuring with a tape line, it may be found by the following rule: Divide the sum of the diameters of the two pulleys by two and multiply the quotient by 3 1/7; to this add twice the distance between the center of the two pulleys, and the result will be the length of the belt.

This rule applies only when the driving pulleys on the motor and the driven pulley on the ringing generator are equal in diameter and the belt open; that is, not crossed. When the pulleys are of different diameters (unless there is too great a difference) the error is so slight that it can be neglected, for all practical purposes.

If it is desired to find mathematically the exact length of belt when the pulleys are of unequal diameter, it can be done by trigonometry, which is the science of measuring the sides and angles of triangles, and ascertaining the relations between them through certain parts which are known.

Direct connection between the induction motor and ringing machine is, however, found to be the best practice owing to the following important factors:. To connect two machine units by means of a belt usually requires considerable space. In addition to this the action of any belt-driven machine is not uniform on account of the slip of the belt on the pulleys. If a sudden overload should be thrown on the machine, the belt may run off the pulleys and damage surrounding equipment.

The side pull on the machine by the belt will cause it to wear unevenly and also cause considerable loss by friction; lastly, the noise caused by a moving belt, especially if a large one, is found too often to be the cause of considerable annoyance. From the foregoing it is plain why the direct-connected type of machine units is preferred.

Bulletin Service on Maintenance and Construction Inaugurated.

Secretary George W. Kloidy of the Nebraska Telephone Association is offering a new and valuable service to member companies in the form of a series of bulletins which cover various phases of telephone plant maintenance and construction. These are being written by a telephone engineer who is thoroughly familiar with all plant problems, and it is suggested that they be bound for future reference.

The first bulletin has to do with operators' telephone set maintenance. Others listed for the future cover transmission improvement on iron wire lines; reduction of crosstalk on rural circuits; elimination of power noise; construction notes for small exchanges; stand material items; office management; sub-set testing and repairing; switchboard and power equipment maintenance. It is believed this will be a popular service.

Dog Assists Night Operator in Directing Attention to Calls.

In the small exchange of the New England Telephone & Telegraph Co. in Grafton, Mass., a thoroughbred collie, Laddie by name, acts as assistant night operator for his owner, Miss Helen Quille, the telephone operator.

The dog invariably accompanies her to the exchange and stays with her during all the night trick, with the result that she never feels timid or lonely when Laddie is on guard. Sometimes during the long night hours when calls are few and far between, Miss Quille gets the chance to relax a little bit.

It is then that Laddie assumes responsibility, and whenever the drop falls on the board, he at once begins growling and barking. Should his mistress be lying on the couch, he will grab the blanket and yank it to the floor in an instant. By no possibility could an emergency call get by Laddie.

The Financial Side of Companies

Miscellaneous Items of Interest Regarding Financial Matters of Telephone Companies—New Securities Issued During Past Month—Figures From the Monthly Reports of Larger Companies to Interstate Commerce Commission

Bell System Financial Operations Exemplify General Policy.

There has been no more striking exemplification of the soundness of the Bell system's general policy than the result of the financing operations of the American Telephone & Telegraph Co. during the last year.

In commenting on the latest stock issue, the New York Times says:

"Financing of $794,000,000 arranged by the American Telephone & Telegraph Co. in the space of a year, which included the most severe market break of modern times, was effected without mortgages and at a net cost to the company of 6.26 per cent yearly on the proceeds of the various issues, it was learned yesterday.

On April 30, 1929, the company announced an issue of $219,000,000 convertible 4½ per cent bonds, which, through a conversion feature applicable from January 1, 1930, will provide the company with an additional maximum amount of $175,000,000 in cash. The total amount of $394,000,000 from this financing will cost the company 5 per cent through an annual return of $9 a share on stock which cost $180 a share.

An issue of $150,000,000 of 5 per cent debenture bonds was offered to the public in January, 1930, or a total of $544,000,000 proceeds raised at a cost of 5 per cent. It is estimated that the offering of stock announced on Wednesday will bring the company $250,000,000 more at a cost of 9 per cent.

As a 5 per cent yield on $544,000,000 equals $27,200,000 annually, and a 9 per cent yield on $250,000,000 amounts to $22,500,000 yearly, the total cost of $794,000,000 additional funds is $49,700,000 annually, or 6.26 per cent."

Earnings of the Class A Companies for February.

Compilations from reports of revenues and expenses of 106 telephone companies, as made to the Interstate Commerce Commission for the month of February, 1930, show gross operating revenues of $94,757,426, as compared with $89,619,069 for the corresponding month of 1929, showing an increase of 5.7 per cent for this year. The operating income for the same month was $21,913,384, a decrease of 2.3 per cent over that of 1929, when it was $22,418,266.

Operating revenues for the two months ended with February, 1930, were $192,632,710, as compared with $183,825,621 for the corresponding period in 1929, showing an increase of 4.8 per cent for 1930. Operating expenses for the same period were $130,574,905 and $120,192,576, respectively, showing an increase of 8.6 per cent for 1930. The operating income for the two months of 1930 amounted to $44,754,492, as compared with $47,344,686 for the same period of 1929, showing a decrease of 5.5 per cent for this year.

The companies, which include those having annual operating revenues in excess of $250,000, had 16,973,939 stations in service at the end of February, 1930, an increase of 5.1 per cent over that of 1929, when there were 16,150,223. Complete data for the Southeast Missouri Telephone Co. were not available for inclusion in this report.

Number of Telephones in Rochester Shows Appreciable Gain.

The annual report of the Rochester (N. Y.) Telephone Corp. for the year 1929 shows at the end of the year 105,107 company-owned telephones and 3,625 connecting telephones, or a total of 108,742 telephones served by the corporation.

The net gain in company-owned telephones was 6,776 for the year. The year 1929 recorded two marks of progress in the corporation's growth. In February, the number of owned telephones passed the 100,000 mark, and at the end of November the number of owned telephones in service was more than double the num-

Items.	Month of February		Increase or decrease (*).		Two months ended with February		Increase or decrease (*).	
	1930.	1929.	Amount.	Ratio, Pct.	1930.	1929.	Amount.	Ratio, Pct.
Number of company stations in service at end of month	16,973,939	16,150,223	823,716	5.1	.....	.....	.....	....
Revenues:								
Subscribers' station revenues	$59,161,012	$55,425,743	$3,735,269	6.7	$118,432,068	$112,029,962	$ 6,402,106	5.7
Public pay station revenues	3,952,383	3,554,586	397,797	11.2	8,285,415	7,571,544	713,871	9.4
Miscellaneous exchange service revenues	905,109	750,919	154,190	20.5	1,786 873	1,519,281	267,592	17.6
Message tolls	24,135,576	24,100.166	35,410	0.1	50,831,586	51,159,372	*327,786	*0.6
Miscellaneous toll line revenues	3,934,536	3,377,225	557,311	16.5	7.955,531	6,725,738	1,229,793	18.3
Sundry miscellaneous revenues	2,631,413	2,365,618	265,795	11.2	5.266.522	4.728.590	537,932	11.4
Licensee revenue—Cr.	1,277,533	1.217,585	59.948	4.9	2.546 900	2,404.201	142,699	5.9
Licensee revenue—Dr.	1,240,136	1,172,773	67,363	5.7	2,472.185	2,313.067	159,118	6.9
Telephone operating revenues	$94,757,426	$89,619,069	$5,138,357	5.7	$192,632.710	$183,825.621	$ 8,807,089	4.8
Expenses:								
Depreciation of plant and equipment	$15,492,194	$14.157,619	$1,334,575	9.4	$ 30,909,121	$ 28.279,230	$ 2,629,891	9.3
All other maintenance	15,389,294	13,753,085	1,636,209	11.9	31.223,044	28,182,220	3,040,824	10.8
Traffic expenses	18,735,554	18,089.367	646,187	3.6	38,989.041	37.164.679	1.824.362	4.9
Commercial expenses	9,036,303	8,341,604	694.699	8.3	18,389,104	16.847.877	1.541.227	9.1
General and miscellaneous expenses	5,580,459	4,795,538	784,921	16.4	11.064.595	9,718.570	1,346,025	13.9
Telephone operating expenses	$64,233,804	$59,137,213	$5,096.591	8.6	$130.574.905	$120,192,576	$10,382,329	8.6
Net telephone operating revenues	$30,523,622	$30,481,856	$ 41,766	0.1	$ 62,057,805	$ 63,633.045	*$ 1,575.240	*2.5
Other operating revenues	$ 108,557	$ 75,173	$ 33,384	....	$ 225 267	$ 168,038	$ 57,229	....
Other operating expenses	81,921	65,921	16,000	....	172.440	138,141	34.299	....
Uncollectible operating revenues	729,975	571,259	158.716	27.8	1 456,194	1,143,560	312,634	27.3
Operating income before deducting taxes	$29,820,283	$29,919,849	*$ 99,566	*0.3	$ 60,654,438	$ 62.519,382	*$ 1,864,944	*3.0
Taxes assignable to operations	7,906,899	7,501,583	405,316	5.4	15,899,946	15,174,696	725,250	4.8
Operating income	$21,913,384	$22,418,266	*$ 504,882	*2.3	$ 44,754,492	$ 47,344.686	*$ 2,590,194	*5.5
Ratio of expenses to revenues, per cent	67.79	65.99	1.80	....	67.78	65.38	2.40	....

Operating Statistics of 106 Class A Companies for February, Compiled from Reports to Interstate Commerce Commission.

ber which the corporation had in service at the beginning of its operations eight years ago.

The increase in density of telephone development in Rochester since the corporation began its operations has been remarkable, the number of telephones per 100 of population having increased from 12.4 at the end of 1921 to 21.7 at the end of 1929, an increase of 75 per cent.

The report points out that the storms of December 7 and 17 were the cause of damage to the corporation's property which required the gross expenditure of nearly $1,000,000, and it also states that the occurrence of casualties of this kind proves the wisdom of the corporation's practice in providing for them in advance through the medium of its depreciation reserves.

The corporation made additions to its plant and equipment amounting to $2,185,373, and it took out of service and removed plant and equipment amounting to $850,194, so that the net additions to its plant and equipment in the year amounted to $1,335,179.

The corporation's operating revenues amounted to $5,203,920.52 in 1929, an increase of 8 per cent. The increase is larger both in amount and in percentage than either the increase of 1928 over 1927, or 1927 over 1926. The increase in operating revenues was the largest in amount except one, in the corporation's history, according to the report.

At the end of the year, the corporation's personnel numbered 1,852 employes, and its payroll for the year amounted to $2,602,887. It paid upwards of $42,000 during the year to 381 employes or their families in the form of pensions, and sickness, disability and death benefits, according to the report. During the year its interest payments were $314,831.01. Dividend payments amounted to $391,390.10, and the corporation added a little more than $500,000 to its surplus during the year.

The corporation handles an average of almost half a million telephone calls daily. In Rochester, the report says, both the number of telephones and the number of calls handled have doubled in the seven years from 1922 to 1929.

Increase in Pennsylvania Telephones Shown by Report.

The Bell Telephone Co. of Pa. had 1,212,089 telephones in operation on January 1 of this year. This represents an increase of 80,966 telephones over the number in service on January 1, 1929, according to the annual report to the stockholders, recently made public by Leonard H. Kinnard, president.

During 1929, the company's investment in telephone plant and equipment increased from $250,377,788 to $272,570,188. At the end of last year the investment in land and buildings approximated $32,740,000. The company owned 109 buildings in the state, two were in the course of construction, and 398 rented buildings were occupied in whole or in part for various purposes.

The company spent $9,769,535 for new outside plant during 1929, while expenditures for land and buildings amounted to $3,237,852. In all, the company made a gross expenditure of $34,719,761 for additions to its plant last year.

In the year just closed, a total of $5,559,406 was spent for additional central office equipment. Ten complete central office units were placed in service. Large additions were made to 56 central office units. A total of 422,236 telephones were being operated on a dial basis at the end of the year.

There were, according to the report, 5,075,206 miles of Bell company wire in service in Pennsylvania, of which 416,736 miles were added during 1929. At the end of the year, 97 per cent of the exchange wire and 87 per cent of the toll wire were in cables.

The average daily volume of local telephone calls during 1929 was 5,128,880, an increase of 364,640 over 1928. In addition, the company handled a daily average of 279,987 toll calls during the year, an increase of 9.8 per cent over the preceding year.

The income statement showed that telephone operating revenues for the year were $1,850,305. After operating expenses, taxes, interest and other necessary deductions were made, the balance of net income available for dividends was $297,099. The total assets at the end of the year, as set forth in the balance sheet, were $7,887,684. Among the liabilities are listed $2,500,000 in common stock and $500,000 in preferred stock.

Statement of Earnings of Northern Ohio Telephone Co.

Operating revenue for the year ending December 31, 1929, of the Northern Ohio Telephone Co., Bellevue, was $937,152.33; total operating expense, $593,926.35, and net operating revenues $343,225.98, deducting $90,366.58 for taxes leaves an operating income of $252,859.40 for operating income. Gross income was $255,880.63; total deductions from gross income, $108,035.94, leaving $147,844.69 net for dividends and surplus. Assets of the company for the year were $4,417.320.18.

The company had a pronounced increase in the number of toll calls originating in its territory. For the 12 months ended December 31, 1929, 1,139,368 toll calls were made and 1,067,092 completed, a percentage of 93.6 per cent. This represents an increase over 1928 of more than 124,000 completed toll calls.

Unusually Good Year Reported by Crete, Neb., Company.

The Crete Telephone Co. reports an unusually prosperous year to the Nebraska State Railway Commission. R. F. Ireland is president and B. G. Miller secretary and manager. It operates 1,096 stations at Crete and 282 at Kramer. The report gives the following figures:

Fixed investment, $135,559; total assets, $171,562; preferred stock, $50,000; common stock, $50,000; payables, $2,613.50; depreciation reserve, $51,471; profit and loss, $13,150.51. The company had total revenues of $36,699.52, divided as follows: Exchange, $27,317.65; toll, $6,601.18; miscellaneous, $2,780.69.

Expenses totaled $23,989.66, divided as follows: maintenance and depreciation, $10,516.69; traffic, $5,708.52; commercial, $7,764.65. The operating income was $12,709.66, out of which was paid $7,259 in dividends, $2,175 in taxes and $3,275.66 passed to surplus.

California Company Shows Increased Income in 1929.

The Southwestern Home Telephone Co., operating in Redlands and vicinity, reports to the California Railroad Commission its 1929 operating revenue at $237,277.56, as compared with $216,697.04 for 1928.

The operating expenses, excluding taxes for 1929, are reported at $162,451.01, and for 1928 at $152,615.06, leaving net operating revenue of $74,826.55 for 1929, and $64,081.98 for 1928. During 1929 taxes charged to operation amounted to $14,867.73, and for 1928 to $13,070.89.

Deducting the taxes leaves operating income of $59,958.82 for 1929, and $51,011.09 for 1928. Adding to the operating income, the non-operating income of the company and deducting non-collectible revenue and rents, results in a gross corporate income (which represents the amount available for interest, amortization of debt discount and expense, other fixed charges, non-operating expenses, dividends and surplus), of $53,542.20 for 1929, and $46,421.56 for 1928.

No Dividends Paid in Order to Build Up Surplus.

Although the Blair Telephone Co. reports to the Nebraska State Railway Commission that in 1929 it had a fairly prosperous year, no dividends were paid, the company planning to still further build up its surplus. It is one of the E. C. Hunt string of companies in Nebraska, and is managed by him from his home at Blair. T. T. Ostermann, a Blair newspaper editor, is the president.

The company operates the exchange at Blair with 1,108 stations, Fort Calhoun with 137 and Kennard with 224, a total of 1,469 stations. The financial report shows the following:

Fixed investments, $139,059; total assets, $170,872; common stock outstanding $48,200; bonds, $60,000; depreciation reserve, $13,315; surplus, $24,768; profit and loss. $1,920.

Exchange revenues, $37,663; toll receipts, $4,049; miscellaneous receipts, $1,032; total revenues, $42,744; maintenance

and depreciation, $14,616; traffic expenses, $8,512; commercial expenses, $11,472; total expenses, $34,600; telephone operating income, $8,143.81; taxes paid, $2,304; interest paid, $3,919.80; passed to surplus, $1,920.

Small Nebraska Company Reports Returns for 1929.

The annual report of the Eustis Telephone Exchange, filed with the Nebraska State Railway Commission, shows the following for 1929:

Fixed investment	$5,252
Total assets	6,635
Stock	4,407
Depreciation reserve	879
Surplus	1,349
Exchange revenue	4,058
Toll revenues	465
Total revenues	$4,523
Maintenance	444
Depreciation	356
Total for maintenance and depreciation	$ 800
Traffic expense	1,080
Commercial expense	1,438
Total expense	$3,318
Operating income	1,205
Taxes paid	175
Passed to surplus	993

P. C. Weissert is manager of the company, which operates 172 stations and 279 switched stations.

California Company 1929 Report Shows Gain Over 1928.

The Colusa County Telephone Co. reported to the California Railroad Commission its 1929 operating revenue at $61,518.61, as compared with $59.753.27 for 1928. The operating expenses, excluding taxes for 1929, are reported at $45,184.79, and for 1928 at $48,915.62, leaving net operating revenue of $16,333.82 for 1929, and $10,837.65 for 1928.

During 1929, taxes charged to operation amounted to $3,238.41, and for 1928 to $3,098.69. Deducting the taxes leaves operating income of $13,095.41 for 1929, and $7,738.96 for 1928. Adding to the operating income, the non-operating income of the company and deducting non-collectible revenue and rents, results in a gross corporate income (which represents the amount available for interest, amortization of debt discount and expense, other fixed charges, non-operating expenses, dividends and surplus), of $8,556.18 for 1929, and $4,438.11 for 1928.

Community Telephone Co., Chicago, Shows Higher Revenues.

Operating revenues of the Community Telephone Co., of Chicago, and subsidiaries for 1929, increased $33,085 as compared with the previous year to a total of $1,076,883. Net income after charges but before federal taxes was $47,611.

The company's ratio of operating expenses maintenance and taxes to gross revenues declined to 59.33 in 1929 as compared with 60.95 in the previous year. Maintenance expenditures amounted to 13.87 per cent of the gross revenues as against 14.36 per cent in 1928.

The consolidated balance sheet as of December 31, 1929, shows current assets of $316,495 and current liabilities of $114,392. Funded debt at the end of 1929 was $4,061,000. Assets aggregated $7,354,245, of which $6,482,195 represented property, plant and equipment.

Western Power, Light & Telephone Co. Preferred Stock.

Nathan L. Jones, president of the Western Power, Light & Telephone Co., Salina, Kans., reports that in a recent 12-day period $192,120 of preferred stock was sold by 250 company operating employes to 889 purchasers. This was accomplished under a customer ownership plan furnished by P. H. Whiting & Co., Inc., of New York City, N. Y. The Western Power, Light & Telephone Co. supplies one or more classes of service to 181 towns located in six Middle Western states.

Bell of Pennsylvania Earnings Decline in First Quarter.

The Bell Telephone Co. of Pennsylvania reports for the quarter ended March 31, 1930, net income of $2,918,898 after taxes and charges, equivalent to $14.50 a share on 200,000 shares of 6½ per cent preferred stock. This compares with $3,159,687 or $15.79 a share in the first quarter of 1929. All the common stock is owned by the American Telephone & Telegraph Co.

The income account for the quarter ended March 31, 1930, compares as follows:

	1930	1929	1928
Gross	$18,240,170	$17,408,502	$16,042,824
Net aft tax.	5,435,719	4,672,850	4,496,862
Total income	4,763,724	4,922,679	4,731,013
Net income.	2,918,898	3,159,687	3,132,485
Pfd. divs....	325,000	325,000	325,000
Com. divs...	1,800,000	1,600,000	1,600,000
Surplus...	$793,898	$1,234,687	$1,207,485

1929 Income of Company Less Than in 1928.

The Whittier Home Telephone & Telegraph Co. reported to the California Railroad Commission its 1929 operating revenue at $189,409.63, as compared with $168,360.53 for 1928. The operating expenses, excluding taxes for 1929, are reported at $116,893.46, and for 1928 at $93,944.63, leaving net operating revenue of $72,516.17 for 1929, and $74,415.90 for 1928. During 1929, taxes charged to operation amounted to $18,619.10, and for 1928 to $16,619.60.

Deducting the taxes leaves an operating income of $53,897.07 for 1929, and $57,796.30 for 1928. Adding to the operating income, the non-operating income of the company and deducting non-collectible revenue and rents, results in a gross corporate income (which represents the amount available for interest, amortization of debt discount and expense, other fixed charges, non-operating expenses, dividends and surplus), of $51,036.56 for 1929, and $54,333.20 for 1928.

Associated Telephone & Telegraph Co.'s 1929 Net Increases.

The annual report of the Associated Telephone & Telegraph Co., Chicago, Ill., shows net earnings after depreciation for the year ended December 31, 1929, of $4,687,187, as compared with $3,037,860 for 1928. Gross revenues for 1929 totaled $13,321,582, against $10,701,622 in 1928.

Net income remaining for dividends on the class A stock was $1,605,155, equivalent to $17.43 a share on the 92,084 shares outstanding. This compares with a balance of $443,649 available for the issue in 1928, or $4.81 a share. The class A stock is entitled to preferential dividends at the rate of $4 a share annually, and participates with the common under certain conditions.

Comparative revenue accounts follow the Associated Telephone & Telegraph Co. for the year 1928 and 1929:

	Year ended December 31 1928	1929
Gross earns	$10,701,623	$13,321,583
Oper. expenses	5,999,884	6,746,933
Net before depr.	4,701,739	6,574,649
Depr. & other res.	1,663,878	1,887,462
Net earn. after dep.	3,037,861	4,687,187
Int. chges., pfd. divs. min. int. etc.	2,594,211	3,082,032
Bal. for A stk.	443,649	1,605,032

The consolidated balance sheet at December 31, 1929, of the Associated Telephone & Telegraph Co. and its subsidiaries shows total assets of $68,289,199 compared with $53,648,778 at the close of 1928. Fixed assets at the end of the year 1929, were carried at $41,603,925, with a depreciation reserve of $10,329,984 standing against this item.

Capitalization of the Associated Telephone & Telegraph Co. at December 31, 1929, was comprised by 30,000 shares of $6 first preferred stock of no par value; $3,500,000 of 7 per cent preferred stock of $100 par value; 50,000 shares of class D stock, paying $4 annually; 92,084 shares of class A stock, and 356,452 shares of common stock. In addition, subsidiary and interests are outstanding aggregating $23,636,789.

Home Company, Ridgway, Pa., Reports 1929 Its Best Year.

The report of the Home Telephone Co. of Ridgway, Pa., states that the results of operations of the company for the year 1929 were the best since its organization. The net income increased $7,600.40 over 1928. This increase was due in part to the gain in stations, increase in toll rev-

enues and the decrease in operating expenses. Other contributing factors were reductions in taxes, rents and interest paid.

A total of 3,850 stations were in service on December 31, of which 125 were connecting stations. During the year 574 stations were connected in order to gain 50.

During the year 351 poles, 183 crossarms and 66 miles of new copper wire were placed in the plant. The gross additions to plant and equipment amounted to $40,854.77. The retirements amounted to $27,427.66. The net additions were $13,427.11, making the total plant and equipment at the end of the year $604,443.42.

The exchange service revenues for the year amounted to $132,007.66, a decrease of $1,049.97 as compared with 1928. This was $35.688 per telephone, a decrease of 27.6 cents per telephone as compared with the previous year.

A total of 137,496 outward toll messages amounting to $67,793.75 were handled during 1929. From this toll business the company realized as its share a revenue of $33,476.95.

The total operating revenues for the year were $168,375.27, an increase of $2,705.49, or 1.63 per cent over the previous year. Current maintenance for the year 1929 amounted to $24,108.99 or $6.516 per telephone compared with $6.444 per telephone for 1928.

A charge of $26,802.98 was made to the operating expense for depreciation, an increase of $640.27 over the previous year. This was an increase of $8,065.34 in the reserve for depreciation at the end of the year. On December 31, the reserve amounted to $31,932.26 or 5.28 per cent of the plant in service on that date.

The traffic expense amounted to $20,728.92, a decrease of $352.78 from 1928. The net earnings available for interest and dividends in 1929 were $57,382.69, an increase of $6,424.52 over 1928. The interest on funded debt was earned 3.19 times and the dividends on the first preferred stock were earned 4.04 times.

The average number of employes for the year was 50, and the annual payroll $57,127.15.

Indiana Bell's Report Gives Financial and Other Results.

The Indiana Bell Telephone Co. had a gross income of $3,401,339 in 1929 and made improvements in property costing more than $5,500,000, according to a report made by directors to the stockholders. Telephone operating revenues of the Indiana Bell during the year were $12,323,338, the report disclosed, and non-operating income amounted to $191,649. Deductions for bond interest on notes and for rental charges amounted to $454,814, leaving a net income of $2,946,525. Dividends paid on the capital stock, 99 per cent of which is owned by the American Telephone & Telegraph Co. amounted to $2,400,000. The corporate surplus for the year was $546,525.

Statistics of Indiana Bell Company at December 31, 1929.

Central offices	96
Private branch exchanges	1,146
Connecting telephone companies	459
Central offices operated by connecting telephone companies	688
Company stations	228,355
Service and private line stations	3,127
Connecting company stations	287,740
Total, owned and connecting company stations	519,222
Miles of pole lines	8,539
Miles of wire	853,709
Average number of exchange messages daily	1,421,160
Number of outward toll messages for year	8,054,885
Number of employes:	
Male	1,532
Female	3,049
Total	4,581
Total payroll expenditures during 1929	$6,042,238

At the end of 1929, the company was serving 519,222 stations, having shown a gain of 24,497 in the year, of which 16,034 were added by purchase of seven affiliated companies. The company possesses 8,539 miles of pole lines. It handles on the average of 1,421,160 messages daily.

In 1929, the construction program of the company was one of the largest ever completed, the report stated. The money was spent in the sums of $1,580,000 for exchange lines, $1,160,000 for toll lines, $1,011,000 for subscribers' station equipment, $853,000 for central office equipment, $676,000 for lands and buildings and $193,000 for general equipment.

New central office buildings were erected at Evansville, Tell City, Kokomo and in a suburb of Indianapolis. Work of placing a new toll cable between Indianapolis and Kokomo was started in the fall of 1929. The cable is an underground tape-armored cable and is a part of a network system covering the state in which the Indiana Bell and the parent company have joint interest.

Speaking of service, the report says: "Progress was made during the year in expediting the completion of orders for new service as well as orders for the moving of existing service. The practice of making appointments with customers as the applications are taken was further extended.

"Under this plan telephones are installed or moved to conform as closely as possible to the wishes of the customers. This service has been well received by the customers.

A further reduction in service interruptions was made during the year. Preventive maintenance work, more careful work on the part of the repair forces, and better original work of installing plant, were largely responsible for this service improvement, and point to even better results for the ensuing year.

Improvement was made in the handling of trouble reports of customers. Repair service in the form provided at the larger exchanges was extended to include other exchanges during the early part of 1929, and will be further extended during 1930.

The surveying of customers' telephone equipment and requirements, which has given such satisfactory results, was continued in 1929. Over 4,000 studies were completed and recommendations for improvements of service were submitted to the various subscribers. Many of the recommendations were accepted.

Further improvements were made in methods and practices involving the collection of revenue. The practice of giving more personal attention to accounts and more completely informing patrons of payment and other requirements was continued.

The plan under which employes took a broader part in the company's activities, which was started in 1928 and known as 'The Hoosier Selling Plan,' was actively continued during 1929 with gratifying results. Under the plan almost 10,000 sales for various classes of service were made by the employes."

The number of connecting companies in Indiana as of December 31, 1929, was 459, the number of connecting company central offices was 688, and the number of connecting company stations was 287,740. All of these companies, the report states, are working amicably with the Indiana Bell company toward improving the service, the standardization of toll operating practices, and the increasing of the efficiency of the toll circuits used for long distance business.

Company Pays Dividends and Reports Surplus for 1929.

The Stanton Telephone Co. reporting to the Nebraska State Railway Commission, shows that it earned and paid 8 per cent dividends in 1929 on its property, and passed $894 to surplus. It is largely owned by A. W. Forbes, president and manager, and H. D. Miller, treasurer.

The report shows a fixed investment of $61,623; total assets, $67,678; stock outstanding, $40,000; payables, $156; depreciation reserve was $25,461.69 and surplus, $1,165.20.

Exchange revenues were $15,447.70; toll revenues, $1,274.69; total revenues, $16,722.39; maintenance and depreciation, $4,500.

Traffic expenses were $3,096.15; commercial expenses, $4,400.09; total expenses, $11,996.24.

Operating income, $4,726.15; miscellaneous revenues, $132.58; taxes paid, $763.96; Dividends paid, $3,200; passed to surplus, $894.77.

The company operates an exchange at Stanton with 439 city and 330 rural stations, a total of 769.

Telephone Securities Offer Investors Attractive Returns.

By Arthur D. O'Neill,
Sales Manager, Telephone Bond & Share Co., Chicago.

Inventory time is here. The other day the writer bought an automobile at cost because the dealer had carried it since November and could not afford to carry it any longer. It is possible to purchase retail clothing and other home necessities at wholesale prices, and at even less than wholesale prices on certain occasions, due to the fact that the merchants cannot afford to carry goods any longer.

The carrying expenses of a business amount to as much as the selling expenses; and the longer goods stay on hand, the more the carrying cost and the greater the chances are of having a loss, unless at the outset the margin for profit takes into consideration the long pull or the slow turnover.

Many investors could well afford to inventory their investments. Often, though some of them may be marketed at a loss, it would pay them to realize cash and invest in something else which more fully meets the requirements of safety of principal, good yield and the realizing of cash, should it be necessary to secure funds at a later date.

It is true that telephone securities represent safe investments. The telephone industry has achieved a position of prominence second to none, in that it has attained a record of steady and persistent growth since its inception, year in and year out.

Regardless of fluctuating general business conditions, telephone earnings show a tendency toward increase. Usually the telephone company does not spend in dividends as much as it earns but invests back in the property a sufficient amount of earnings to make up for depreciation of property value and to add a certain part of the expense of improvements.

In addition to this, the assets behind the preferred stocks of a telephone company are usually better than two to one; that is, for every dollar represented by a share there are more than two dollars of assets. Earnings likewise are in excess of dividend requirements—two or more times dividend requirements.

The yields are good, consistent with the risks involved, which are few. Therefore, the yields at the present time are exceptionally good, ranging from 6¼ per cent or more according to the type of preferred stock selected.

Many issues of preferred stock are listed on recognized stock exchanges where the investor may sell independent of the investment house from which he has purchased the security. In other words, the investor may ask his bank or his broker to sell over the exchange. Of course, it is preferable, from the investor's standpoint as well for the investor, to negotiate any sale of a security possessed by him through the one who sold it to him if it is at all possible, and usually it is possible in the case of telephone securities.

Due to the popularity of employe and customer stock ownership, a large part of junior financing can be done among telephone company employes and telephone subscribers, leaving only a part of the preferred stocks available to the investor at large.

Current Price Quotations on Listed Telephone Stocks.

	May 16, 1930 High.	Low.	Last.
American Telephone & Telegraph Co.	248	246½	247
American Telephone & Telegraph Co. rights	20¾	20½	20¾
Associated Telephone & Telegraph Co., A	64⅜	64	64⅜
Associated Telephone & Telegraph Co., pfd. (6)	96¼	96¼	96¼
Associated Telephone Utilities Co.	26¾	26¼	26¾
Cincinnati & Suburban Bell Telephone Co	111	109½	111
Community Telephone Co.	25	25	25
Chesapeake & Potomac Telephone Co., pfd.	116¾	116¾	116¾
Empire Public Service Co.	21	21	21
International Telephone & Telegraph Corp.	65	64⅛	64⅜
New York Telephone Co., (6½) pfd.	116	116	116
Ohio Bell Telephone Co., pfd.	114	114	114
Pacific Telephone & Telegraph Co., com.	143	143	143
Western Power, Light & Telephone Co.	25	25	25

OVER THE COUNTER QUOTATIONS.

	May 16. Bid.	May 15. Asked.	Bid.
Associated Telephone Utilities Co., $6. pfd.	84	88	...
Associated Telephone Utilities Co., $7. pfd.	95	100	...
Bell Telephone Co. of Canada	150	153	150
Bell Telephone Co. of Pennsylvania	115½	118	115½
Cuban Telephone Co., 7, pfd.	101	107	101
Diversified Investments, Inc., pfd.	66⅛	68½	...
Lincoln Telephone & Telegraph Co.	120	...	120
Mountain States Telephone & Telegraph Co.	146	150	146
National Telephone & Telegraph Corp., pfd.	103	105	...
New York Telephone Co., pfd.	20	24	20
Northwestern Bell Telephone Co., pfd.	107½	...	107½
Peninsular Telephone Co.	25	...	...
Peninsular Telephone Co., pfd.	105½	...	105½
Porto Rico Telephone Co.	85	...	85
Porto Rico Telephone Co., pfd.	100	...	100
Rochester Telephone Corp., 1st pfd.	107	110	107
Southern New England Telephone Co.	180	185	180
Wisconsin Telephone Co., pfd.	112	...	...

Good Year Reported for Newark, Ohio, Company.

President W. L. Cary, in the annual report of the Newark Telephone Co., Newark, Ohio, states that the past year has been among the best the company has enjoyed, in gross and net earnings, and favorable conditions of operation. Although severe storms visited nearby localities, the Newark company has been comparatively free from storms, and the large expenditures which such casualties usually entail.

Nearly 9,000 stations are operated now, there being a small increase during the year. This number includes private branch exchange stations and extension telephones. During the year the company occupied a new office and exchange building in Newark, where new and rebuilt equipment has been set up. As a result, the service has been more dependable and consistent than ever before. This has improved the relations of the company with its patrons and the public, generallly.

The company has a plant investment of $1,238,430.84 and total assets of $1,348,681.54. It has $591,700 of capital stock issued and a funded debt of $200,000. The reserves amount to $356,370.44. The company has an appropriated surplus of $6,750.00 and an unappropriated surplus of $85,184.43. Income and expenses for the year ending December 31, 1929, are:

Income.	
Exchange service revenues	$271,109.30
Toll service revenues	24,420.43
Miscellaneous operating revenue	8,963.85
Non-operating revenue	746.41
Total income	$305,239.99
Expenses.	
Maintenance and depreciation	$123,182.28
Traffic	20,931.44
Commercial	16,119.14
General	23,795.91
Non-operating	196.97
Uncollectible	1,189.82
Taxes	32,607.69
Rent deductions	2,812.46
Interest deductions	12,537.03
Sinking fund	1,500.00
Dividends paid	24,000.00
Balance net income	46,367.25
Total expense	$305,239.99

New Issue of Bonds of Associated Telephone Co., Ltd.

Offering of a new issue of $6,000,000 first mortgage 5 per cent gold bonds, Series A, of the Associated Telephone Co., Ltd., Long Beach, Calif., was made early this month by a syndicate composed of Paine, Webber & Co., Bonbright & Co., Inc., and Mitchum, Tully & Co.

The bonds, dated March 1, 1930, and maturing on March 1, 1965, are priced at 97½ and accrued interest, to yield 5.15 per cent. The proceeds will be used in part to retire bonds of predecessor companies and to reimburse the company for expenditures for additions to property. Gross earnings, including all properties now owned, for the year ended on February 28, 1930, were $2,368,598.

The Associated Telephone Co., Ltd., operating in southern California, is a part of the Associated Telephone Utilities System.

Personal Notes from the Field

Tom Griffith is the new manager of the Central Iowa Telephone Co., Collins, Iowa, succeeding R. C. Dood, of State Center.

H. E. Harrison of Ash Grove, Mo., has moved to Fredonia, Kansas, as the resident manager of the Home Telephone Co., filling the vacancy caused by the resignation of J. E. Reynolds.

Obituary.

William L. Lemon, general auditor for the Lincoln Telephone & Telegraph Co., Lincoln, Neb., died very suddenly the evening of May 16 at his home after suffering a heart attack while taking his dinner with his family at the Shrine Country club. He was almost 44 years of age, and 25 of these were spent in the service of the telephone company.

Mr. Lemon was well known among telephone men the country over through the excellent service rendered by him as chairman of the accounting division of the United States Independent Telephone Association during the past three years. Prior to that time he was for years chairman of the northwestern group of the accounting division of the national association. His loss will be keenly felt in the telephone field.

Born June 27, 1886, at Hartington, Neb.,

W. L. Lemon, Auditor of Lincoln Company and Chairman of Accounting Division of National Association, Died Very Suddenly After Suffering a Heart Attack

he attended the University of Nebraska after graduating from high school. In 1905 he entered the service of the Lincoln Telephone & Telegraph Co. at Lincoln as a time clerk. A little later he became a bookkeeper.

When the Lincoln company purchased the Bell properties in the South Platte section of Nebraska, Mr. Lemon was promoted to the office of chief accountant. In 1918 he was made general auditor, a position he retained till his death.

Although retiring of nature, few men were as active in civic and social affairs. He was a member of Alpha Tau Omega fraternity, St. Matthews Episcopal church, a member of the University club, first ceremonial master of the divan of the Mystic Shrine, Sesostris temple; and had held many important positions in Masonic bodies.

He was secretary-treasurer of the Lincoln Lions club and a member of the Lincoln chamber of commerce. He was also active in Community Chest work from its beginning in Lincoln, and devised the uniform accounting system and centralized bookkeeping utilized by that body.

His death came as a great shock to his associates. In his honor General Manager J. H. Agee called together a number of company employes the following morning, and in his address said that Mr. Lemon was everywhere regarded as the highest type of a citizen, known for his kindly interest in others, his industry and outstanding loyalty, and commanded the respect of all company employes. His kindly and friendly ways had endeared him to an unusually wide circle of friends.

He was a man of quiet and retiring ways, essentially clean-minded and wholesome. In his special work his methods and records had attracted more than ordinary attention, as was indicated by the fact that since 1927 he has been chairman of the accounting division of the national independent telephone association. Company officials feel that the institution has suffered an irreparable loss.

His immediate associates on the executive staff of the company, J. H. Agee, W. E. Bell, H. H. Wheeler, C. P. Russell, R. S. Brewster and M. T. Caster officiated as active pall bearers at the funeral on Monday, May 19, when he was buried in Lincoln with Masonic orders. Four of the company directors, including Frank H. Woods, president, were on the list of honorary attendants.

Mr. Lemon is survived by his mother; his wife, Margaret Byers Lemon, and two children; two brothers and one sister.

P. R. Ferguson, auditor and director of the Interstate Telegraph Co., of Bishop, Calif., and for many years treasurer of the California Independent Telephone Association, passed away recently at the age of 65.

Mr. Ferguson became identified with the telephone industry, in 1903, as auditor for the Rocky Mountain Bell Telephone Co., with headquarters at Salt Lake City, Utah, the company operating in the states of Utah, Idaho, Wyoming, and Montana. In 1911 the company was consolidated with the Colorado Telephone Co., as the

The Late R. P. Ferguson, for Years Treasurer of the California Association and Auditor of the Interstate Telephone Co., Bishop, Calif.

Mountain States Telephone & Telegraph Co., with executive and operating headquarters in Denver, Colo. Mr. Ferguson occupied the position as auditor of disbursements of the consolidated company until 1912, when he moved to California and was, for a short time, connected with the accounting department of the Pacific Telephone & Telegraph Co.

On April 1, 1913, he became auditor and assistant secretary of a group of industrial companies, being more particularly interested in the generation, transmission and distribution of electrical energy, and having also under his supervision a large artificial ice industry, a railway, and a telephone company.

In recent years he had been devoting his entire time to the accounting problems of the industries with which he was affiliated, giving special attention to the telephone company of which he was auditor and director, the Interstate Telegraph Co., of Bishop, Calif.

Mr. Ferguson's absence was keenly felt by his friends and associates at the recent annual convention of the California association and a resolution of tribute to his memory, passed by the executive committee at the time of his death, was read at one of the convention sessions.

With the Manufacturers and Jobbers

Lubricating Cable Sheaths so Cables May be Withdrawn.

By T. Richards,

Adam Cook's Sons, Inc., New York.

A recent survey of all the prominent utilities in and around New York, which draw cables underground, convinced the writer that little consideration is given this important task, considering the important part cables play.

A lead sheath covering 900 or 1,200 pairs of small wires, is certainly something of great importance, and merely just drawing them through the ducts is not completing the job. It is true that raw chalk, ordinary soap or grease—in fact, most anything that is liquid or slippery—will answer the purpose for drawing. Yes, and even some cables may be drawn through the ducts without any assistance whatever. Still, with the constant additional service wanted and needed, one never knows when another cable with a larger capacity will have to take the place of the present cable to meet the increased demand of service.

What happens when you use anything of inferior quality—a compound that separates, a grease that contains matters deleterious to cables? There are many serious things happening: The sheath cements to the duct, for the water and other happenings unexplainable (because we can't see through the ducts), cause the product that was used, to vanish, leaving the sheath with a hard substance, caked here and there. Therefore, when the men start withdrawing the cable many jerks are necessary and the cable generally comes out ruined.

Perhaps two engineers out of a hundred will give the same opinion relative to the proper way and product to use for drawing cables. However, if you consider the following when you select your cable pulling compound, the writer is certain your problems will be solved.

A thorough lubricant that spreads and does not separate; a compound of the proper consistency, the one that can be applied with a stiff brush; that method saves you 50 per cent through its economy. If the grease is stiff, one can readily appreciate that its lubricating qualities (because it cakes on the sheath) are far from the spread that is necessary to lubricate properly and reduce stress.

There is a compound on the present-day market which seems to have solved the question of the various obstacles confronted while pulling cables. This lubricant apparently is the proper one, for a prominent public utility reported that 67,000 feet of heavy cables were pulled through concrete ducts, using only 1,460 pounds of this comparatively new cable pulling compound.

A quality lubricant should stay on the sheath for many years to some. It is then always ready to be pulled out, anytime, without anyone worrying whether it will break or tear a truck apart in withdrawing.

Many thousands of dollars are spent annually by public utilities in making tests of various cable compounds; high-salaried men devote hours of concentration to them. With all this, it is very difficult to determine any efficiency, for seldom are there ever two conditions alike in any two ducts; unless the ducts are pipe, and then there is still some uncertainty.

Get a laboratory to examine the compound it is contemplated testing and if nothing deleterious to the cable sheath is found in it, select four or five competent men and issue several hundred pounds to each one for a field test; have each report and then decide. Not only will a company find this the most satisfactory way of testing, but, it is also the most efficient and economical way, for a man in the field comes in contact with conditions that do not exist in laboratories.

M. A. Oberlander, Oldest Employe of the General Department of Graybar Electric Co., Presents His President, Frank A. Ketcham, Nationally-Known Figure in the Electrical Industry, With a Gold Service Pin Emblematic of 30 Years' Service With the Graybar Organization. The Event Took Place Friday, May 9.

Stromberg-Carlson Telephone Equipment Displayed Recently by a Rochester Business Firm During the Company's Annual Sales Conference. This Display Was One of Ten During the Conference.

Stromberg-Carlson Telephone Mfg. Co. Declares Extra Dividend.

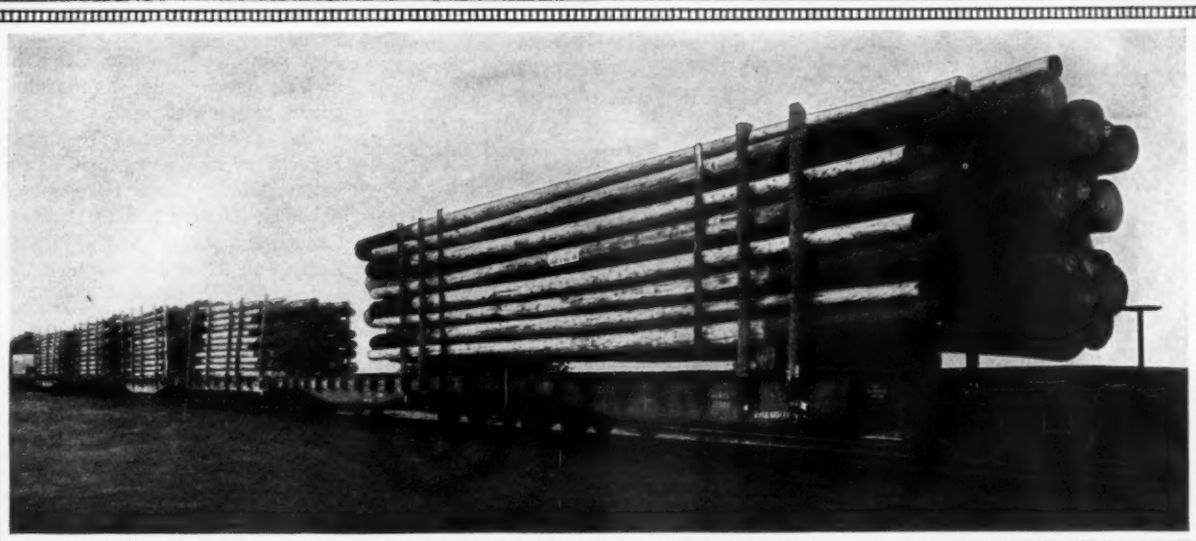
Due to record earnings for the first quarter of 1930, an extra dividend of 12½ cents a share, additional to the regular quarterly dividend of 25 cents, has been declared and will be paid June 2 to common stockholders of record as of May 19 by the Stromberg-Carlson Telephone Mfg. Co., according to an announcement from Rochester, N. Y.

Payment of an extra dividend will mean that dividends for the first half of 1930 will total 75 cents a share. In 1929 extra dividends were paid in March and December, and the total payments in that year on the common stock amounted to $1.25 a share.

Aluminum Posture Chairs to Match Modern Office Equipment.

The Do/More Chair Co. of Elkhart, Ind., pioneers of posture seating service, announces the development of a line of aluminum posture chairs that reflect the modern trend of ultra-fine appearance in office design and furnishings. These chairs combine smart design with

Fast Shipping Service on "P & H Process" Poles



A shipment of "P & H Process" Poles leaving our Saint Paul (Minnesota Transfer) yards.

MANY utility companies are saving money on storage, handling, insurance and interest costs by reducing the number of poles stored in their yards and utilizing "P & H" Fast Shipping Service.

The dependability of this service is made possible by complete stocks on hand at all times, strategic location of our plants, prompt loading, ceaseless car tracing and accurate information to utilities on car movements.

For lower-per-annum cost lines, specify "P & H Process" Poles.

"Still in the Lead"

Predetermined results through laboratory control of "P&H" operations

PAGE AND HILL CO.

MINNEAPOLIS, MINN.

New York, N. Y., 50 Church St.
Boston, Mass., 733 Public Service Bldg.
Dayton, Ohio, 854 Reibold Bldg.
Chicago, Ill., 20 North Wacker Drive Bldg.
Kansas City, Mo., 455 Dwight Bldg.
Omaha, Neb., 711 Electric Bldg.

Do/More's regular elements of correct seating. They are adjustable to fit the individual physical requirements of the occupant and like all Do/Mores are fitted to occupants by Do/More's corps of seating experts.

The combination of artistic design with

The No. 516 Do/More Aluminum Chair for Executives.

the correct anatomical lines that have made Do/More famous is a noteworthy achievement. It means that America's business men now have available a line of posture chairs that match their beautifully-appointed offices and at the same time gives them the health benefits of correct seating.

Beautiful finishes contribute to the fine appearance of these chairs—the standard finishes being flat and grained mahogany, flat and grained walnut and grained oak. A variety of special finishes are available also. Seats, back and arm rests are heavily upholstered with curled hair in a fine quality of grain leather in blue, brown, red or green.

In keeping with the Do/More policy of building chairs that last a lifetime, the bases are made of cast alumium of great tensile strength which prevents spreading.

Comfort in the new Do/More aluminum chairs is assured by the fact that support is provided at the small of the back where it is needed, which together with other anatomical features makes for correct posture and elimination of normal fatigue.

Associated Telephone Utilities Buys Ohio Cities Telephone Co.

The Associated Telephone Utilities Co., Chicago, Ill., announces the purchase of the Ohio Cities Telephone Co. with exchanges at New Philadelphia-Dover, Mineral City, Sugar Creek, Baltic, Berlin and Chili, Ohio.

New Philadelphia and Dover, having a combined population in excess of 25,000 are operated as a single unit, both towns being served by an automatic exchange. The remainder of the exchanges are common battery. The total number of stations operated exceed 6,000; estimated population of territory served exceeds 35,000.

The Ohio Cities Telephone Co. operates 328 miles of pole line, 1,851 miles of aerial wire, 13,480 miles of underground cable, and 3,187 miles of aerial cable.

Names That Give Unique Distinction in Telephone Directories.

Lately there has sprung a unique competition among telephone subscribers, in the larger cities of the country. It is for the distinction of having the very last listing or name in the telephone directory.

Pedro Zyxx holds the undisputed cellar position in the new city directory, issued May 2 in San Francisco, Calif., but he has nothing on Xanttules Xanttafulos when it comes to unusual names.

Chicago's telephone directory offers A. Zzyncks as its parting shot. In the Manhattan, New York, telephone directory, Zebediah Z. Zzyz had the honors until R. Cantarrana Zzyzz and Margot Wilson Zzzyn had telephones installed.

Prices in the Metal Markets.

New York, May 19: Copper—Steady; electrolytic spot and future, 13c. Iron—Quiet; No. 2, f.o.b. eastern Pennsylvania, $18@19; Buffalo, $16@16.50; Alabama, $12@14. Tin—Weak; spot and nearby, $31.75; future, $32. Lead—Steady; spot New York, 5.60c; East St. Louis, 5.50c. Zinc—Quiet; East St. Louis spot and future, 4.65c. Antimony—7.50c. Quicksilver—$118.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Winona County Company, Minnesota, to Acquire Rural Lines.

Acquisition by the Winona County Telephone Co., of Lewiston, of certain rural telephone property in the vicinity of that exchange was approved by the Minnesota Railroad & Warehouse Commission on May 15.

It was represented at the hearing that the Winona County Telephone Co. operates local telephone exchanges in the villages of Rollingstone, Altura and Lewiston, with rural lines radiating therefrom. The following named rural telephone lines were operated from the Lewiston exchange on a switching basis: Lewiston Rural Telephone Co., Bethany Rural Telephone Co., Big Five Telephone Co., Freemont Telephone Co., Utica Telephone Co., Warren Rural Telephone Co., Wyattville Telephone Co., Telephone Line No. 55, and Telephone Line No. 68.

It was further represented that H. E. Wirt, a resident of Lewiston, has secured full possession of the entire physical properties of the above named rural lines and desires to sell and transfer them to the Winona County Telephone Co., and the Winona County Telephone Co. desires to purchase these properties and consolidate them with its Lewiston exchange and to furnish service to the former patrons of these lines on its own rural lines and at the rate now in effect at the Lewiston exchange for such class of service.

Upon review of all the facts, the commission finds that it is to the best interest of the public and the former patrons of these lines that the proposed sale and consolidation be effected. In the approval of the transfer of these properties the commission gives no consideration to the value or price paid therefor.

To Convert Farm Lines at Talmage, Neb., to Metallic.

The Nebraska State Railway Commission has authorized the Lincoln Telephone & Telegraph Co. to convert the farm lines at its Talmage exchange from grounded magneto to metallic magneto service. This is in line with the company's policy of eliminating bad service conditions at those exchanges where the rural lines are paralleled by high tension lines of power transmission companies.

At the same time it enables the company to increase revenues. At the present time the company has a grounded rate of $1.35 a month net at Talmage, and the new order permits this to be increased to the standard rate of $1.75 a month.

In spite of the fact that farmers are most sensitive to rate increases, the company has found it comparatively easy to get an average of 80 per cent of the rural users to sign up for the better and higher-priced service. On 16 of the 20 lines more than two-thirds of the subscribers signed up, but on the other four it failed to get a sufficient number. The application was granted without a hear-

Burroughs Electric Portable

Adding-subtracting machine illustrated, $175 delivered U. S. A.; $205 in Canada. Other electrics as low as $130; hand models as low as $80

Fast . . . Compact . . . Economical

FAST . . . because a light depression of motor bar actuates the motor, which instantly completes the operation. Total key also actuates the motor.

COMPACT . . . because the motor is built directly into the mechanism without increasing the size of the case, or affecting the portability of the machine. It is therefore ideal for both desk and office use.

Light in weight and easy to carry from desk to desk

ECONOMICAL . . . because the greater speed and ease of electrical operation minimize operator fatigue, and result in increased production.

For a demonstration of the Burroughs Portable best suited to your requirements, call the local Burroughs office, or write—

BURROUGHS ADDING MACHINE COMPANY
6136 SECOND BOULEVARD, DETROIT, MICHIGAN

BACKED BY WORLDWIDE BURROUGHS SERVICE

When writing Burroughs Adding Machine Co., please mention TELEPHONY.

ing insofar as the 16 lines are concerned, it being a condition that the company will not convert any of the remaining four upon which consent has not been secured until such time as at least two-thirds of them have signed. The company is completing reconstruction of the rural lines generally at this exchange.

Abandon Plan to Make Valuation of Lincoln, Neb., Company.

At a recent mass meeting held by telephone users at Hastings, Neb., it was voted to abandon the idea of raising $4,000 or $5,000 in order to employ an engineering firm to make a thorough valuation of the Lincoln Telephone & Telegraph Co., which is asking for a material increase in rates. About half that sum had been subscribed. Instead the committee has employed for $500 S. B. Lyman, who formerly operated the Independent exchange at Hastings to represent it in the various hearings.

The Nebraska State Railway Commission has assured the telephone users that its force of engineers is available for public use, and that no necessity exists for the expenditure of private funds to make valuations. The commissioners also told the committee that there is a strong probability that the reproduction new value of the plant, a plan of valuation upheld by the courts, will result in a higher figure than that claimed by the company.

New Regulation Filed by Company at Lowville, N. Y.

A new regulation has been filed with the New York Public Service Commission by the Black River Telephone Co., of Lowville. It applies throughout the territory served, and provides as follows:

"In each central office district in territory outside the base rate area, where facilities are available, coin-box service will be provided at hotels, clubs, lodging houses and other public places appropriate for public telephone service at a rental of $9 per annum for the coin box in addition to a guarantee of revenue from local messages equal to the minimum business rate for the class of service installed within the particular area. The regular mileage charges prevail.

"Extension stations with coin-box equipment will be furnished on the same premises, in connection with guaranteed public telephones at the rate of $1.75 per month."

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

May 1: Order issued approving acquisition by the Lehigh Telephone Co. of Hazleton, Pa., of the properties of the Lower Saucon Telephone Co., Lower Saucon, Pa.

May 8: Order approving the acquisition by the Bell Telephone Co. of Nevada and the Mountain States Telephone & Telegraph Co. of the properties of the White Pine Telephone Co.

May 26: Hearing at Washington, D. C., in the matter of the application of the Chesapeake & Potomac Telephone Co. of Virginia for authority to acquire control of the Petersburg Telephone Company, of Petersburg, Va., by purchase of capital stock.

ALABAMA.

May 1: Approval given sale of Coffeeville Telephone Co., of Coffeeville, by J. L. Deas to P. A. Holland.

ILLINOIS.

May 21: Hearing on application filed by Southwestern Bell Telephone Co., at Springfield, for increased telephone rates for service in New Athens.

May 22: Hearing on application of Sparta Telephone Co., at Springfield, for increased telephone rates in Sparta.

May 22: Hearing in the matter of an application by the Corn Belt Telephone Co., Springfield, for an order making permanent the present increase of 25 cents per station per month for telephone service; petition filed by a number of villages for reconsideration of order granted by commission and cases set for further hearing.

INDIANA.

May 1: Patrons of the Public Service Telephone Co. of Leesburg, and of the Home Mutual Telephone Co. of Atwood, owned by the Northern Indiana Telephone Co., filed petition for a rehearing on the commission's order of August 3, 1929, pertaining to telephone communication between the Leesburg exchange and the Atwood and Milwood exchanges of the Northern Indiana company.

The petition represents that patrons of neither company were sufficiently notified of the hearing last summer and were not represented at the meeting; and that the commission's order as it now stands works an unnecessary hardship on the business of Leesburg and on the patrons of the Atwood and Milwood exchanges, in that the dividing line between the two companies is only two miles west of Leesburg, whereas the natural trading territory of the town extends four to six miles west and Leesburg always has been the trading point for the majority of the patrons of the Atwood and Milwood exchanges.

May 9: People's Co-operative Telephone Co., of Manson, authorized to raise its rates from $1.25 monthly to $1.50 for party line service, and $1.75 for single line service—a charge of 25 cents to be added for each mile or fraction of a mile beginning with the second mile from the exchange.

May 13: Hearing at Amo on the petition of the Amo Mutual Telephone Association for authority to increase telephone rates.

May 14: Hearing at Lafontaine relative to petition of the Lafontaine Telephone Co. for increased telephone rates. Many residents of the town appeared to protest against any increase.

MAINE.

May 20: Hearing on application of Maine Telephone & Telegraph Co. for permission to sell all its property to the New England Telephone & Telegraph Co., which now owns all of the former company's stock except qualifying shares held by directors.

MINNESOTA.

May 15: The commission denied without prejudice the application of the Winsted Telephone Co. for authority to change its schedule of rates at Winsted. The company may, upon proper presentation, renew its application, if it elects so to do. The commission found that the present and estimated property value is unsupported by evidence, and that the records and accounts of the company do not correctly reflect its operations; that the proposed rates are in exces of rates required to permit the company to properly meet the service requirements.

May 15: The commission approved the sale and transfer of certain rural telephone lines in the vicinity of Lewiston by H. E. Wirt, an individual, to the Winona County Telephone Co. The former patrons of these lines will hereafter be furnished standard multi-party rural service from the Lewiston exchange of the Winona County company at the rates authorized for such class of service.

MISSOURI.

May 8: Application filed by the Western Telephone Corp. of Missouri to establish a schedule of rates for common battery telephone service at Clarence.

May 16: Application filed by Western Telephone Co. of Missouri, for permission to file new schedules of rates for telephone service at Merwin, Creighton, Altona, Raymore, Archie and Amsterdam.

NEBRASKA.

May 12: In the matter of the application of the Lincoln Telephone & Telegraph Co. for authority to substitute metallic for grounded rural service at Talmage exchange, with increase in monthly rates to $1.75; found reasonable, but company required to secure consent of two-thirds of patrons on each line before making change.

May 16: Application filed by the Blair Telephone Co. for authority to charge 50 cents a month for monotype service in addition to regular rates; found reasonable and granted.

OHIO.

May: Valuation of Kidron (Ohio Telephone) Co. reduced by $6,000 from company's figure of $23,453.

OKLAHOMA.

June 3: Hearing in the matter of application of the United Telephone Co. for increase in rates at Watonga.

WISCONSIN.

April 29: Waunakee Telephone Exchange authorized to increase rates for desk telephones and for hand-sets 15 cents per month at its Waunakee exchange.

April 30: At a hearing in Madison, the Commonwealth Telephone Co. was ordered to file a new schedule of rates in order to rectify errors made in previous filings.

May 22: Hearing at Rhinelander for the purpose of investigating matters relative to the application of petitioners for the increasing of rates for the Pine Lake rural telephone line. The Rhinelander Telephone Co. receives switching service from the Pine Lake line.

May: The commission approved a new schedule of rates for the Eau Galle Telephone Co., of Eau Galle, providing for increases in the residence classifications.

May: The commission approved an increase of 25 cents per month in the rate of the Greenwood Telephone Co., of Greenwood, and approved the purchase by this company of the properties of the Black River Telephone Co.

May: The commission authorized the Platteville, Rewey & Ellenboro Telephone Co. to place in effect, June 30, a toll rate of 10 cents for the first three minutes and five cents for each additional minute for calls between Platteville and Rewey and between Platteville and Livingston, regardless of their routing.

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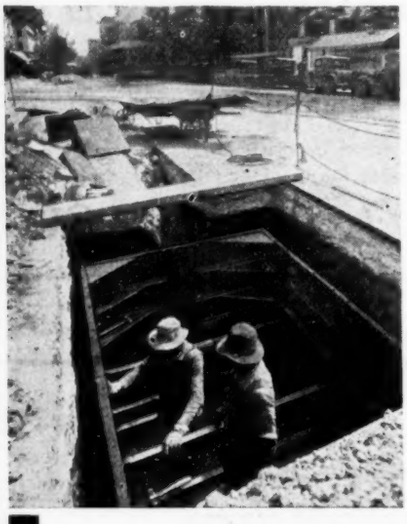

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Kansas Has "Best Ever" Meeting

(*Continued from page 27.*)

the cities and a part of the smaller towns. While there is much to be done, the outlook is better than at any past period.

There are now 366 separate telephone organizations in Kansas operating 738 exchanges and serving 368,213 stations. Of this number there are 13 larger companies operating 385 exchanges, serving 291,000 telephones. The remaining 353 exchanges, most of them small in size and generally operating one exchange each, serve 77,000 telephones.

A considerable number of these 77,000 telephones are located in small towns and rural districts, which have barely held the original number of subscribers installed prior to 1910. The majority of these small exchanges are operated by mutual companies and their telephones have been repaired and patched up to do the best they may for a poor grade of service; and it is to be noted that these farmers have been sold on the use of electricity, automobiles, radios, tractors and trucks but these mutual companies control their own destinies and the future of their service is still to be solved.

Now as to the future: I believe the time of radical buying has passed since the crash of the stock market stopped high financing but the legitimate consolidation of the smaller exchanges with each other is still possible if made in a conservative manner. The rural telephone user in the smaller individual exchanges will eventually waken up to the fact that his equipment of grounded service with obsolete telephones is not efficient and that with paved highways should come metallic service with common battery and machine switching service, at an adequate rate for such service.

I do not think that these mutual telephone companies will ever make their telephone service modern; their change of ownership will be slow. But when opportunity offers to a group to gather several small exchanges, their reconstruction should be properly engineered, financed and operated so that the rural public will receive an adequate service and pay an adequate rate.

The prices of labor and material have not decreased much from the war level. Taxes have increased, the better grade of service demanded costs more than the old type of magneto service and the public is entitled to the better grade of service. While competition within has about ceased, another competition, from without, is much more keen.

The public has its dollar to pay for its necessities and we must remember that the public now demands the automobile, the use of electricity, the radio, the tractors and trucks. The flying machine is here carrying the U. S. mail and loads of passengers. That dollar is being chased pretty hard and any telephone manager who imagines that he does not have competition is sadly mistaken for it is not like the years 1900 to 1910 when the telephone started and old Dobbin had the highway. This present-day competition is not from within; it is from without, and that which the public thinks is the greatest to be desired, gets the dollar.

In this struggle against competition, the Kansas Telephone Association, which is composed of the progressive telephone leaders of Kansas, has always found that it had to make common cause in meeting the problems of the telephone business.

No one company has available all of the ideas and it is by the association being the recipient of the thought of all of the telephone organizations that we may progress to the utmost."

Upon the conclusion of the president's very interesting and helpful address a talk was made by Chas. C. Deering, secretary-treasurer, of the United States Independent Association. Mr. Deering discussed national problems of interest to all and showed that the problems of the telephone men were nation-wide and had to be met by all. He brought a message from F. B. MacKinnon, president of the national association, in which he expressed his regrets that he could not be present with his old friends and neighbors at the Kansas meeting due to the fact that the Couzens bill had been reported back to the committee and that out of necessity he must be on hand to answer any questions they might desire.

President Tucker at this time called upon Fred Coulson, of Abilene, to make a few remarks, and his remarks developed into a real message. Mr. Coulson called attention to the fact that we must interest the younger generation in the telephone industry, for through them more progress will be made during the next 10 years than has been made in the last 50 years.

They will not stand on tradition like the present telephone men, he declared, but will develop different sales methods. Mr. Coulson predicted that through these young people we would see a telephone in every room, and in every basement, and in every attic in every house in this country. He further predicted that the time would come when these young people would look back with amazement when they heard that in our day there was such a thing as busy lines, for he feels that the time will come when our service will be developed to such a point and sufficient lines will be furnished by the company so that a telephone could never be busy. He compared the telephone industry with the electric light and power industry, which started shortly after the telephone indus-

try, but which has outstripped the telephone industry in the service to the public.

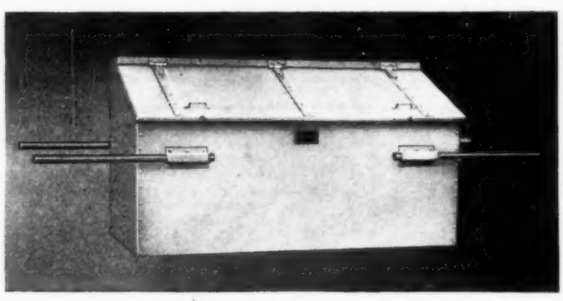
He called attention to the fact that those in the electric light and power field sold the people their apparatus including electric irons, washing machines, vacuum cleaners, etc., and then sold them electric service. He went on to show that they did not stop there, but maintained a sales force to continuously keep the subscriber's equipment up to date and sell them the latest of equipment to replace that which they already owned. In contrast with this he pointed out that in the telephone industry, the telephone men bought the equipment, rented it to the subscriber and sold them service. And due to lack of capital telephone men are still renting them this 1900 telephone during 1930.

Mr. Coulson expressed the belief that telephone men had gone at things in the wrong way and should have sold the subscriber the instrument and then sold him service, thus reducing the capital investment and at the same time giving the telephone company an opportunity to create a demand for the highest type of equipment through a sales force and keep the subscriber's equipment up to date and at the same time make a profit on the sale in the same way as the electric light and power industry does. He felt that in the case of the small companies this system must be followed out through lack of capital in order to give the public the right type of service.

Following was a very inspiring and instructive address on the subject "Electrical Transmission of Personality" by L. S. O'Roark, information manager of the Bell Laboratories, New York City. Mr. O'Roark had a wonderful personality himself and handled this extremely difficult and technical subject in a very interesting manner, using phonograph records and other apparatus.

The annual banquet followed by the dance was held Wednesday evening, May 14, on the roof garden of the Hotel Jayhawk with Fred Coulson of Abilene presiding as toastmaster. The banquet was attended by 250 telephone men and women, and was enjoyed by everyone of them.

A very interesting entertainment pro-



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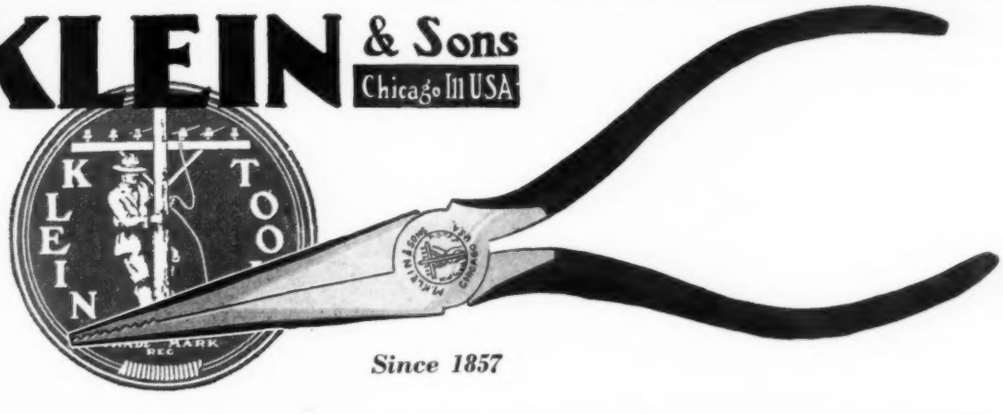

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gram was staged by the Jolly Jones entertainers.

Following the introduction of visitors, H. A. White of the American Electric Co. presented District No. 9 with a beautiful banner in honor of the best attendance at the district meetings held in April. This banner was received by A. B. Geesling, of Turon, the chairman of district No. 9 and will be held by him until some other district takes it away. Mr. White suggested that this banner cover four series of district meetings and that the district winning the banner the greatest number of times during these four series by having the largest attendance should have permanent possession of it. Mr. Geesling thanked Mr. White for this expression and assured him that it would never leave their possession.

The address of the evening was given by Col. Wm. A. Biby, aid to Gov. Reed, in the absence of the governor. The speaker called attention to the necessity for individuals forgetting their own individual troubles and desires and the necessity of each community for forgetting its local aspirations and thinking only of the state as a whole and working for the common good by working for the state.

From 9 p. m. to 12 p. m. those attending the convention enjoyed the annual dance, which was voted the best ever held.

Concluding Session of Convention.

The Thursday morning session on May 15 was also a general session. It was presided over by President Tucker and was open to general discussion. The work of the association in holding the district meetings was enthusiastically supported and cooperation assured for the future district meetings to be held.

It was brought up that one of the great needs of the small company was some means of making each employe a part of the industry and this step of organizing the women's section was praised. However, it was felt that they should go farther and furnish some means of keeping the employe in touch with what was going on, and recommended that a committee be appointed—composed of C. J. York of Girard, H. B. Couch of Topeka, Elliott Belden of Abilene and H. F. Rehg of Salina—to work with the secretary to study out ways and means of financing and publishing an official publication for the association in which the interests of the small companies will be presented.

In view of the fact that it was recognized that the manufacturers and supply companies had definitely decided to withdraw from all advertising except in the national publications, some plan must be worked out to finance this publication, if feasible, and the work of this committee will consist in finding the best and most sensible plan for handling this much needed addition to the association work. The committee was instructed in the motion to gradually increase the present bulletin as

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is now issued and if a plan were found feasible of publishing the regular publication they were instructed to proceed at once.

A resolution was adopted endorsing a program of observance of the 200th anniversary of the birth of George Washington to take place in 1932 under the direction of the George Washington Bicentennial Commission and pledge the support of the Kansas Telephone Association to extend earnest cooperation to the United States commission in all possible ways so that future generations of American citizens may be inspired to live according to the example and precepts of Washington's exalted life and character, and thus perpetuate the American Republic.

Following this resolution the nominating committee reported on nominations for the officers and directors for the ensuing year which were unanimously adopted:

President, Samuel Tucker, Pleasant; vice-president, Fred Coulson, Abilene; second vice-president, T. L. Youmans, Osawatomie; treasurer, V. E. Chaney, Kansas City, Mo.; assistant treasurer, Panford Dunlap, Kansas City, Mo.; secretary, A. R. MacKinnon, Topeka.

Executive Committee: Three-year term, R. B. Fegan, Junction City; C. J. York, Girard; C. A. Ulffers, Kansas City, Mo.; two-year term, Fred Coulson, Abilene; G. W. Nimocks, Scandia; J. A. Gustafson, Abilene; one-year term, Foster Laming, Tonganoxie; H. J. Clark, Salina; G. B. Foscue, Kansas City, Mo.

After closing remarks by the president complimenting the association on this wonderful convention just concluded and the new spirit shown by all the telephone companies, the convention came to a close and was officially adjourned.

Home Athletic Association of Fort Wayne, Ind., Elects Officers.

Frank X. Staub, commercial engineer for the Home Telephone & Telegraph Co. at Fort Wayne, Ind., was re-elected president of the athletic association of the company at the annual organization meeting of the board of directors of the association held recently.

Ralph Zollinger, assistant plant accountant, was made secretary; and Leo Moulin, assistant installation and maintenance supervisor, was named treasurer. Lewis Gerding, chief accountant, and Henry Krabach, plant accountant, secretary and treasurer, respectively, of the association, and Frank Baker, a past president, completed their terms on the board last month.

New members to take their place on the board are: Earl L. Gaines, traffic superintendent; Dorothy Federspiel of the plant department, and Pansy McClintock of the commercial department. Holdovers from last year are: B. C. Schweitzer, commercial superintendent; Edward Meier, Mr. Moulin and Mr. Zollinger. Harry E. Gray, general plant superintendent, is the company's representative on the board.

The association at present numbers 375 employes of the company. Plans are already being made for social activities that the association will sponsor during the coming year. The association enjoyed one of its most successful periods last year.

Columbus to Circleville Underground Cable Completed.

The new all-cable underground long-distance telephone line from Columbus to Circleville, a distance of 24 miles, and from Columbus to Canal Winchester, a distance of 15 miles, has been completed by the Ohio Bell Telephone Co. These circuits are being cut to service as rapidly as possible. The cable lines are the first of the sort in Ohio, according to W. W. Acord, district commercial manager. The system consists of underground conduits to Circleville with a branch east to Canal Winchester. Circuits to Lancaster and the Hocking Valley section join onto the underground route at Canal Winchester.

E. A. Doyle Elected President of American Welding Society.

E. A. Doyle, consulting engineer of the Linde Air Products Co., was elected president of the American Welding Society at its recent annual meeting.

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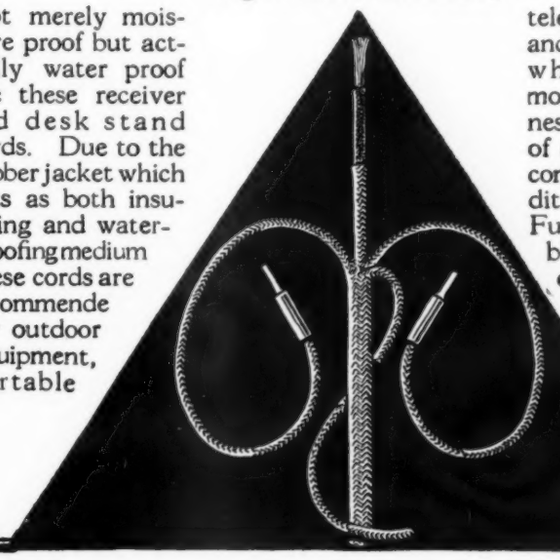

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New, Reliable, 16 pair unprotected cable terminals with stubs @ $5.00.

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FOR SALE—One 3-position section Kellogg Universal Switchboard, two positions equipped. 260 local lines equipped, 40 toll and rural lines equipped. Relay equipment and Cook main frame. Now in service. Mount Horeb Telephone Co., Mount Horeb, Wis.

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FOR SALE—12 Stromberg No. 950 B. Y. iron clad "Central Energy" weatherproof telephones at $12.50 each, good condition. CORWIN ELECTRIC CO., Indianapolis, Ind.

FOR SALE—Controlling interests—five hundred telephones, one plant, modern residence—gross eleven thousand dollars; exceptionally good rates; terms; located central Indiana. Address 7754, care of TELEPHONY.

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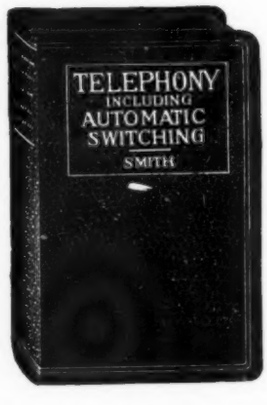

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